plating

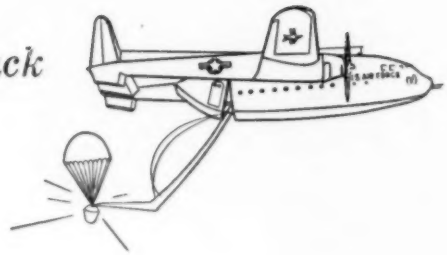
DECEMBER · 1960

Season's Greetings

JOURNAL OF THE AMERICAN ELECTROPLATERS' SOCIETY

University Microfilms
313 N. First St.
Ann Arbor, Michigan

finding the golden needle in the haystack



(Top right) *sketch illustrates mid-air catch of returning Discoverer XIV nose cone snagged by an airplane-towed "skyhook."* (left) *A captured practice capsule is slowly reeled towards the rear opening of airborne C-119 Recovery Plane.*

NOSE CONES PLATED WITH SEL-REX BRIGHT GOLD* RECOVERED FROM SPACE ORBITS!

Orbiting the globe, then returning earthward upon signal, Discoverer XIV's space capsule plummeted home to be snatched from the heavens in an historic mid-air catch!

U.S. teamwork had plucked the nose cone from a million miles of firmament—marking a significant stride forward in the Free World's space program.

The returning space capsule was plated with Sel-Rex Bright Gold. So was its predecessor, Discoverer XIII, which had been rescued earlier from the Pacific Ocean.

This patented plating process was applied by Philadelphia Rust-Proof Co., Inc. to provide maximum heat reflectivity and emissivity, under sub-contract from General Electric Company, Missile and Space Vehicle Department. Sel-Rex precious metal plating processes, in fact, are included in the original specifications of many advanced Space Age projects.

As producer of the world's largest selection of precious metal processes, Sel-Rex offers unique dependability to users of its plating systems. For, Sel-Rex engineers have removed the guess work, instead assure you of consistent plating quality, the quality that counts in critical areas.

Sel-Rex sales and service technicians throughout the Free World are ready to serve you with unmatched professional precious metal plating services.

Technical literature free on request. Specify precious metal(s) and your application.

(Above) *President Eisenhower holds American flag which was in recovered capsule during its flight through space. Capsule shown was electroplated with patented Sel-Rex Bright Gold Process. With the President are General Thomas D. White, Air Force chief* (center) *and Col. Charles G. Mathison, who directed the "capsule chase."*

**Patented*

Patented processes for plating with Gold, Rhodium, Platinum, Paladium, Silver, and to produce "custom alloys" for your particular requirements.

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SEL-REX CORPORATION
NUTLEY 10, NEW JERSEY
World's largest selling precious metal plating processes

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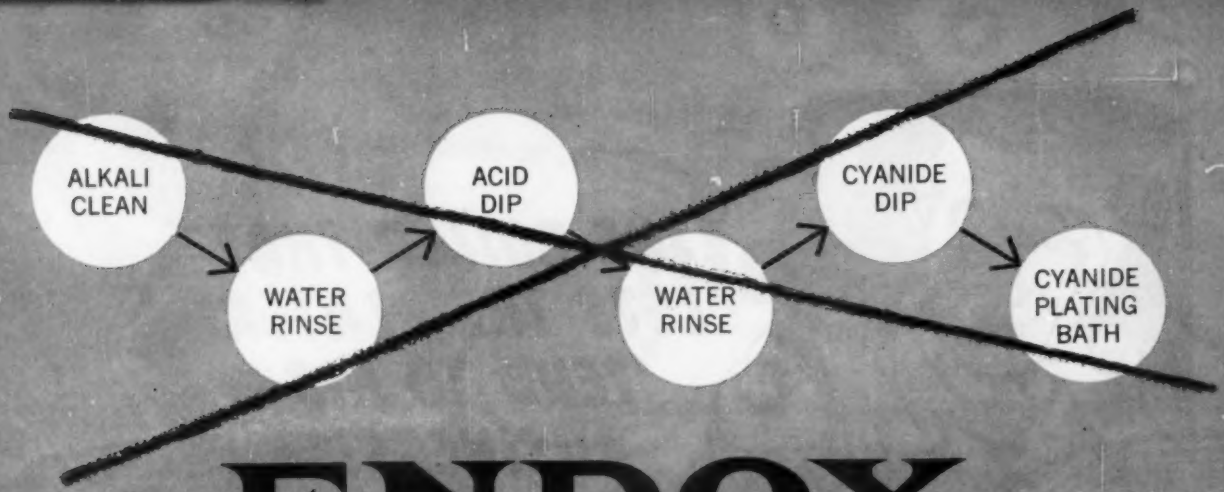

ENDOX

the PATENTED alkaline deoxidizing process prepares steel for plating in one simple step!

In one, simple electrolytic operation, Endox completely removes rust, scale, smut, soil and oxides from steel and activates it for plating. On work that has been precleaned to remove heavy solid soils, no alkali cleaner, acid dip or cyanide dip are required. Endox replaces them all and gives superior plate adhesion, especially on difficult-to-activate alloy steels. Acid attack and acid fumes are eliminated by use of this room-temperature, alkaline process.

Endox cuts rinse water volume (and rinse water waste treatment costs) way down since there's only one brief rinse in the entire cycle prior to plating in a cyanide plating bath. Endox solutions contain sodium cyanide and are compatible with all cyanide plating solutions.

Endox also produces excellent results prior to acid plating baths. It has solved many problems involving adhesion of nickel plate to malleable iron and alloy steel parts which are later subjected to stress. Prior to acid plating, however, the alkaline Endox residue should be neutralized by a dilute acid dip or "sour rinse".

Endox can be used in both barrel and rack plating lines. Endox solutions are very economical to use because they can be maintained indefinitely by periodic analysis and replenishment, just like a plating bath.

Enthone pioneered alkaline deoxidizing and derusting and first introduced such techniques in 1951. In recognition of this, Patent No. 2,915,444 has been awarded to Enthone. Benefit from our long experience in alkaline pickling; write for literature on Endox and the name of your nearest Enthone representative who will be glad to process sample parts for you. Enthone, Inc., 442 Elm Street, New Haven, Connecticut.

ASARCO

ANOTHER PRODUCT OF Enthonics RESEARCH

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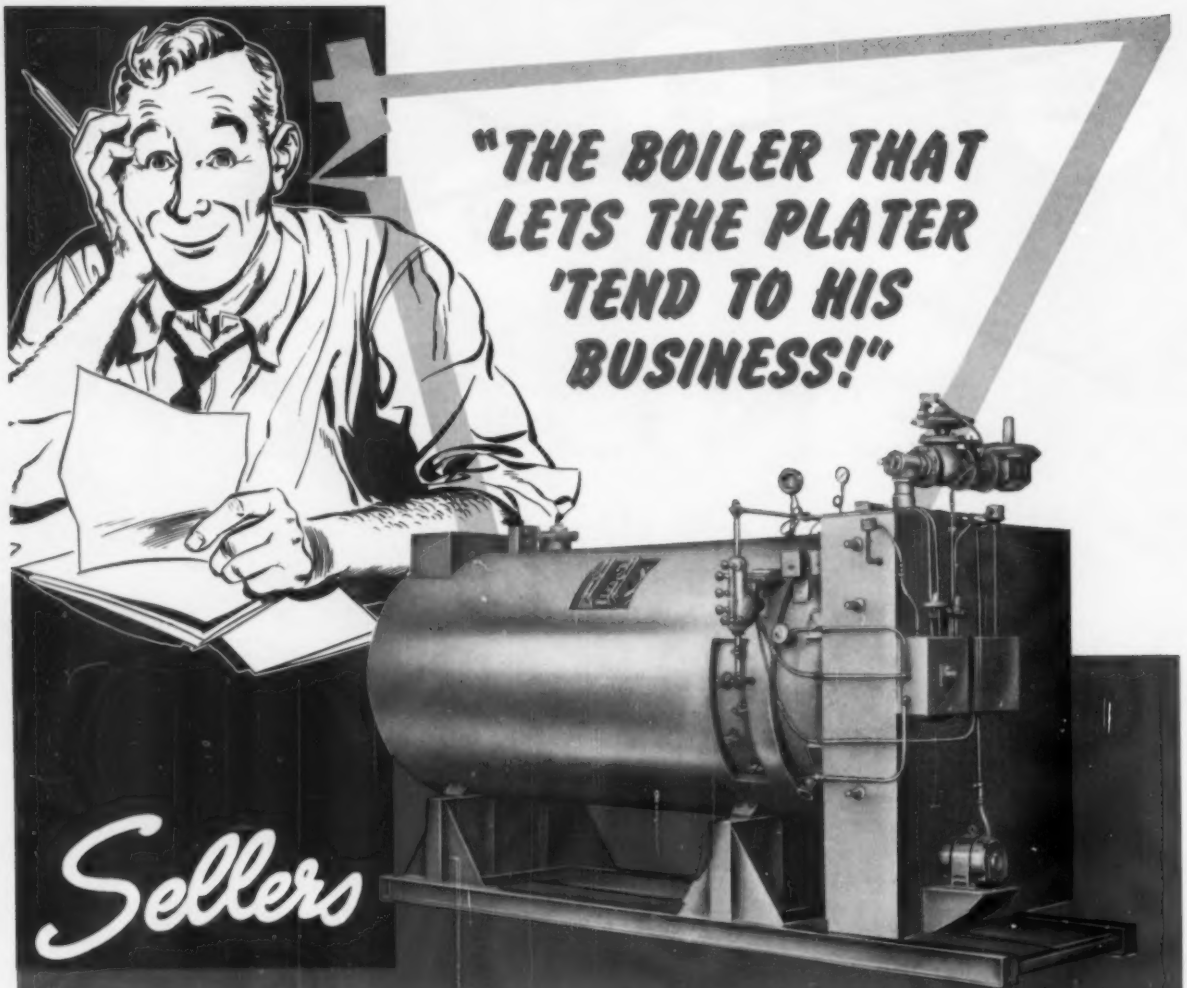

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Cover by James A. Civille

plating
JOURNAL OF THE AMERICAN ELECTROPLATERS' SOCIETY

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Harshaw announces

NiChlor 31

a significantly improved nickel chloride

IMPROVEMENTS:

- Non-caking
- Contains more nickel —less bulk
- Easier handling
- More uniform particle size
- Same cost per pound of nickel
- Quick dissolving characteristics

A new nickel chloride with less water of hydration demonstrating marked improvements over that previously available to Platers has been developed by The Harshaw Chemical Company.

Called "NiChlor 31," this new product has a typical average of 31% nickel compared with 24.5% in ordinary nickel chloride. This means that .8 lb. of "NiChlor 31" is equivalent to 1 lb. of regular nickel chloride, and results in easier handling and storing.

"NiChlor 31" is non-caking, uniform, and of high purity with quick dissolving characteristics. On the basis of nickel content, "NiChlor 31" is offered at no increase in cost.

Complete information may be obtained by contacting The Harshaw Chemical Company, 1945 East 97th Street, Cleveland 6, Ohio.

Write for FREE Booklet, "HARSHAW'S COMPLETE SERVICE to the PLATING INDUSTRY"

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FOR FURTHER INFORMATION, USE READER SERVICE CARD: INDICATE A 1203.

FOURTH ESTATE

FOR centuries in the bygone, in the so-called Middle Ages, European society was principally divided into three Estates, namely 1) the Clergy, 2) the Nobility and 3) the Bourgeoisie or those engaged in commerce and trade. But in the mid-Eighteenth Century, a Fourth Estate emerged from obscurity to resounding reality.

England's great Statesman, Edmund Burke, focussed attention upon it about 1770 when, speaking before the House of Commons, he dramatically pointed to the working press in the gallery of that Assembly Hall and exclaimed, "Yonder, gentlemen, sits the Fourth Estate, more powerful than all the others". Naturally, he meant the representatives of the press who, even in that era, helped to mould public opinion.

Since that far off day, the configuration of the Fourth Estate has broadened. Today, it embraces the editors, columnists and writers for all forms of publications plus, of course, the commentators of television and radio and all those others who assist in the development and dissemination of news. It is a proud Estate, one that has, generally speaking, disciplined itself to a high plane of ethics, craftsmanship and service. Its superb record made in World War II under its voluntary code of censorship is a random and worthy demonstration of an Estate responsibly at work in the public interest.

Over a span of more than half a century, American Electroplaters' Society (AES) has developed its own representative in America's Fourth Estate, namely its own half-century old PLATING MAGAZINE. And that medium, for years, has served and serves the largest audited paid circulation in the field of electroplating, metal finishing and allied arts.

To its wide international readership, AES's representative in the Fourth Estate means technical articles by experts that enrich the knowledge of PLATING MAGAZINE's respective audited classifications of readers. To the Society's members, from company president to foreman, from scientist to artisan, it also means coverage and interpretation of AES and Branch news and data of broad AES membership interest. To them and to the substantial and growing number of AES non-members internationally who are also paid subscribers of PLATING year-after-year, it also means current industry and intersociety news—plus up to date information concerning equipment and supplies, patents, trade literature, article references, personals and other elements of balanced and reliable news coverage of the industry. To its advertisers, it consequently means effective exposure of their product merchandising messages to a large segment of this market's purchasing power.

As a member of our nation's Fourth Estate, PLATING proudly serves these. And to each of them as the time nears when church bells will proclaim the miracle of the Nativity, it extends its hearty best wishes for a very Happy Christmas and for a healthy, peaceful and generally rewarding 1961.

John P. Nichols

Chairman, Editorial Board
and Managing Editor

A new idea in plating

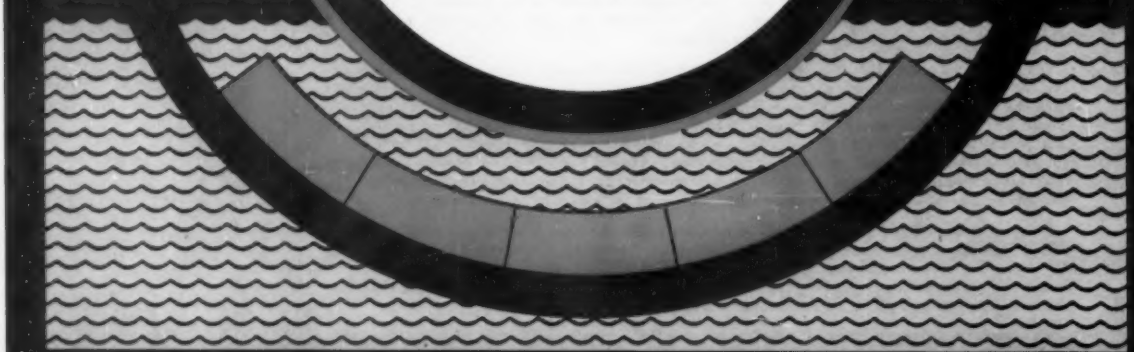
ANACONDA

announces

"PLUS-4"

phosphorized copper anodes

in a new form



CURVED ANODES

for plating cylinders faster and more uniformly

To make anode surfaces parallel the rotogravure cylinder being plated, and to fit the curve of the current-carrying slings, Anaconda "Plus-4" phosphorized copper anodes are now extruded to precisely curved shapes.

This design gives both cost savings and improved cylinder quality:

1. A more evenly plated cylinder. Because the distance between the cylinder and the anode surface is more uniform, the copper deposit is smoother and more uniform.

2. Finishing operations in most cases are reduced, as much as 50%, because of the uniform copper deposit.

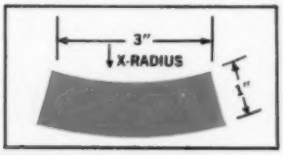
3. Less scrap because anodes corrode more evenly.

4. Improved electrical efficiency and faster plating because of better contact with sling.

For more information, write: Anaconda American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

60107 L

Note: When you request information, please specify inside radius of anode.



"PLUS-4"® phosphorized copper anodes

products of

ANACONDA®

Anaconda American Brass Company

here,

there . . .

almost everywhere

Members of the specially trained, 70-man field auditing staff of the Audit Bureau of Circulations* make regular calls on 2,900 publications . . . ours included . . . located in almost as many places.

The ABC auditor's call might last a day, a week, or even several months . . . just as long as it takes him to make a complete audit of our circulation records and obtain the information about our circulation audience that ABC will later publish.

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Yes, the ABC auditor has been here . . . and he will be here again, calling to check on how well we are doing our job and to provide the facts to help us *and our advertisers* do even better.

PLATING MAGAZINE

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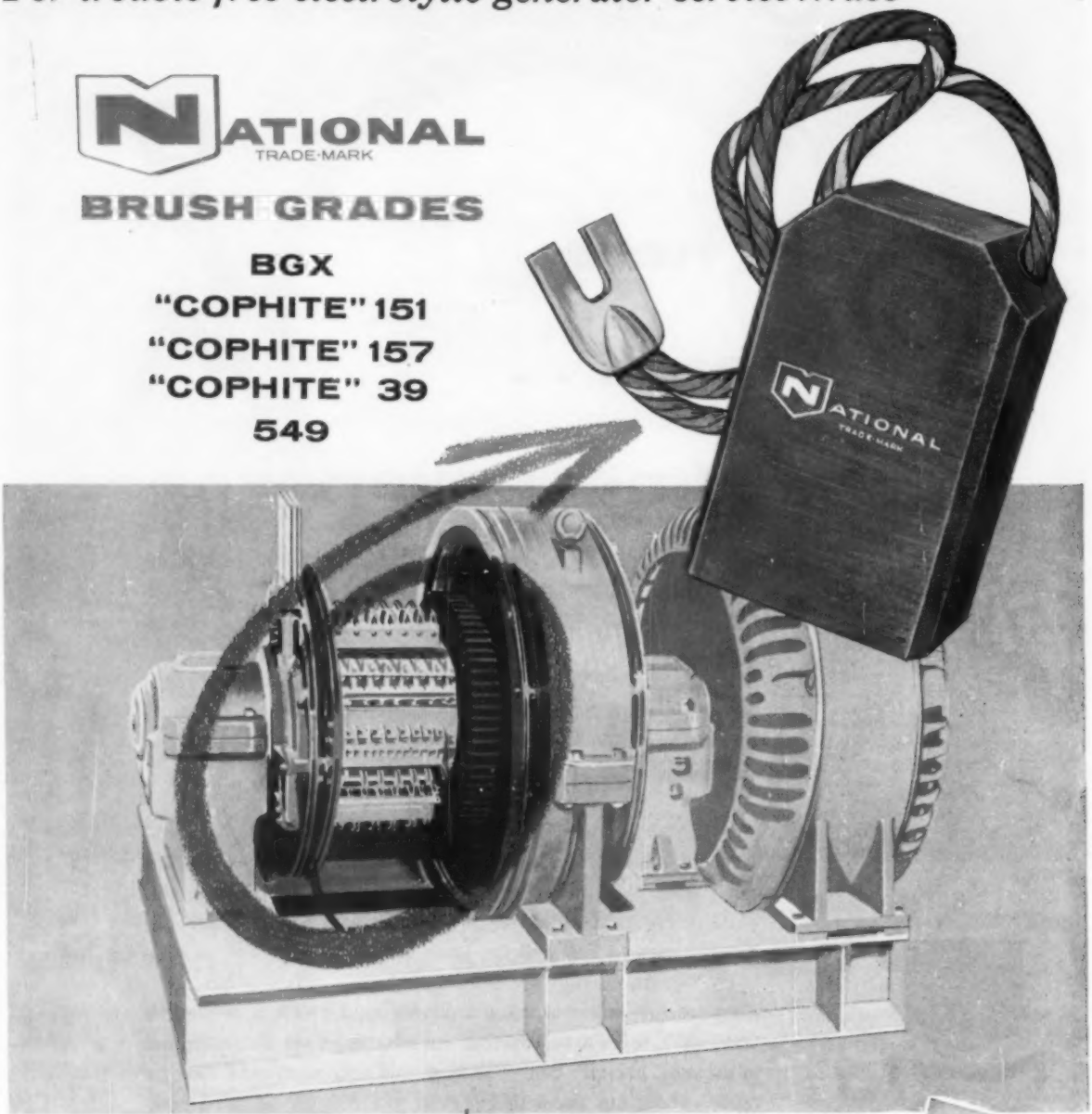

■ Wherever you use low-voltage generators for electroplating — tinning, galvanizing, anodizing or general plating, you can be sure of maximum equipment efficiency and life with "National" brushes on the job. Be certain you have the proper brush grade for your specific low-voltage generator application. A "National" brush specialist will gladly offer his recommendations — call him today!

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This interestingly written and illustrated manual is designed to assist electrical maintenance men engaged in the operation and maintenance of low voltage generators. It is written in the interest of better brush and machine performance.

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UNION CARBIDE

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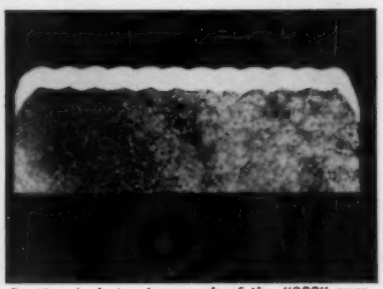
Skilled plater lowers an electrode with Perfect Circle piston rings into a bath of Mutual® Chromic Acid.

Photo shows the Perfect Circle "200" chrome top compression ring (L) and "98" self expanding oil ring (R). The face of the compression ring and the steel rails of the oil ring are plated with solid chrome .004"-.007" thick.



Sectional photomicrograph of the "200" compression ring shows interrupted surface and thick plating of chrome.

FOR PRECISION CHROME PLATING PERFECT CIRCLE USES MUTUAL CHROMIC ACID

Perfection is the goal in producing piston rings. Each is machine tooled to exacting specifications and the chrome plating must be flawless. To safeguard against plating difficulties . . . and expensive rejects . . . Perfect Circle Corporation relies on Mutual Chromic Acid. Like many experienced platers, Perfect Circle knows that careful control, plating skill plus Mutual Chromic Acid add up to a top quality chrome finish.

Mutual Chromic Acid is always 99.75% pure—or better. Sulfate content never exceeds 0.1%. Rigid quality control by Mutual insures that the chromic acid you get is always the same. This makes it easier for you to control accurately the acid-sulfate ratio of your plating bath.

To obtain further information about these and other advantages of Mutual Chromic Acid, send coupon for our free booklet, "Chromium Chemicals." Our Technical Service Staff will also be happy to offer help or information at any time.

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70-120

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☐ Have a representative phone for appointment

Name_____
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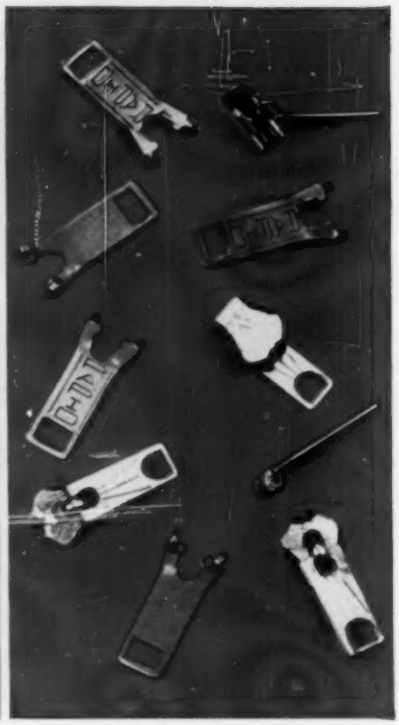
Lustrous appeal in lamp components. A New Jersey job plating shop uses BURNEK 22 for bright burnishing lamp parts after brass plating. Parts are ball and self burnished for 30 minutes, rinsed, dried, and lacquered.

Bright, stain-free handbag parts. A company making handbags and pocketbooks uses BURNEK 22 for burnishing small steel frames, corners, and ornaments before bright nickel and gold plating. Parts are then rinsed and dipped in dilute sulfuric acid.



Clean, scratch-free zipper pulls. A large Eastern zipper manufacturer uses BURNEK 22 in open-end oblique barrels to remove stamping oil and bright burnish brass and steel parts. Parts are then ball burnished 45 minutes.

Burnish parts mirror-bright at low cost with BURNEK 22!

Brass, copper, nickel, silver, gold – you name it, Wyandotte BURNEK® 22 can burnish it to a bright luster with exceptional savings! Even handles short runs on aluminum, zinc, steel, and stainless-steel parts.

Most important, BURNEK 22's low cost and short running time help you slash burnishing costs to the bone. So why wait? Call your Wyandotte representative for a revealing demonstration in your own plant. Do it today!

Wyandotte Chemicals Corporation, Wyandotte, Michigan, Also Los Nietos, California, and Atlanta, Georgia. Offices in principal cities.

Wyandotte CHEMICALS

J. B. FORD DIVISION

The Best in Chemical Products for Metal Finishing

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What better time to lay aside electronic brains, space

rockets and world-wide tensions . . . and open our hearts

to the true spirit of Christmas and the Holiday Season.

Your ROHCO Distributor and Technical Representatives join all of us at Rocky River in wishing you an old-fashioned MERRY CHRISTMAS AND HAPPY AND PROSPEROUS NEW YEAR!

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The RIGHT START . . . a BETTER FINISH

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BUSTLE-BOUND or FAST 'N' SMOOTH

how does your chrome plating stack up?

You can keep your chrome-plating process in step with today — with Diamond CPA 1800®.

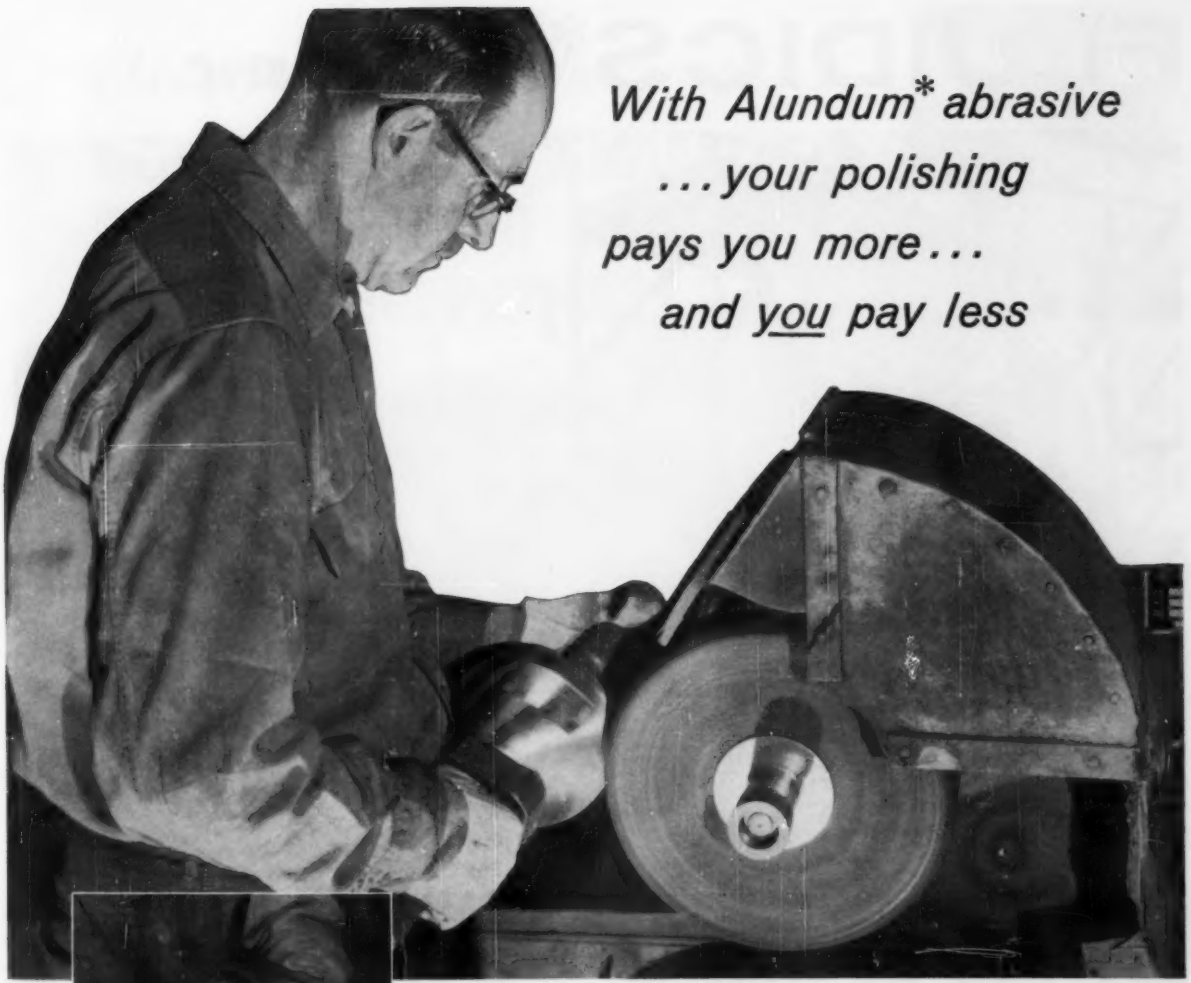
For example: Viking Copper Tube Co., of Cleveland, Ohio — with mandrels plated by the CPA 1800 process — draws 1500 feet of copper tubing per minute to extremely close tolerances with almost unbelievably reduced deterioration in machine tools!

This same job-proven additive is available to you. To increase plating speed and covering power. To allow a broader operating range. To simplify anoding and produce a brighter, harder coating. To improve the metallurgical characteristics of chromium plate.

In short: Diamond CPA 1800 can cut your unit costs and save you money. Diamond developed it. Your Diamond CPA 1800 Distributor can supply it where and when you need it.

For further information write or call Diamond Alkali Company, 300 Union Commerce Building, Cleveland 14, Ohio.

Diamond Chemicals



With Alundum abrasive ... your polishing pays you more... and you pay less*

A stainless steel floating ball, chief feature of a leading valve manufacturer's product, requires a high polish for its high efficiency. ALUNDUM abrasive is the leading manufacturer's selection for this important polishing job.

Setting up your polishing wheels with ALUNDUM abrasive is easy and profitable. This grain's high capillarity speeds and strengthens the wetting process with glue or cement — making your wheels last longer and polish better.

Where finish is essential to product appeal or product efficiency, Norton ALUNDUM abrasives are the first choice in many plants. For extra long service life the blocky-shaped E_1 ALUNDUM B abrasive in grit sizes 14 to 240 is widely popular. For faster cutting action E_{155} ALUNDUM S abrasive (grit sizes 14 to 90) or E_{155} ALUNDUM R (grit sizes 100 to 240) are preferred.

Uniform grain shapes and sizings of these popular Norton abrasives assure fast cutting action, with no oversize grains to mar the finish, no undersize grains to lag on the job. And their high capillarity provides the easy absorption of glue or cement that means longer lasting, better performing set-up wheels.

The booklet *"Setting Up Metal Polishing Wheels and Belts"* tells you about the various types of ALUNDUM abrasives . . . or their uses when applied to canvas, leather or wooden wheels . . . and the best means of preparing wheels. Ask your Norton Distributor for it. Or write to NORTON COMPANY, General Offices, Worcester 6, Massachusetts. Plants and Distributors around the world.

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NORTON
ABRASIVES

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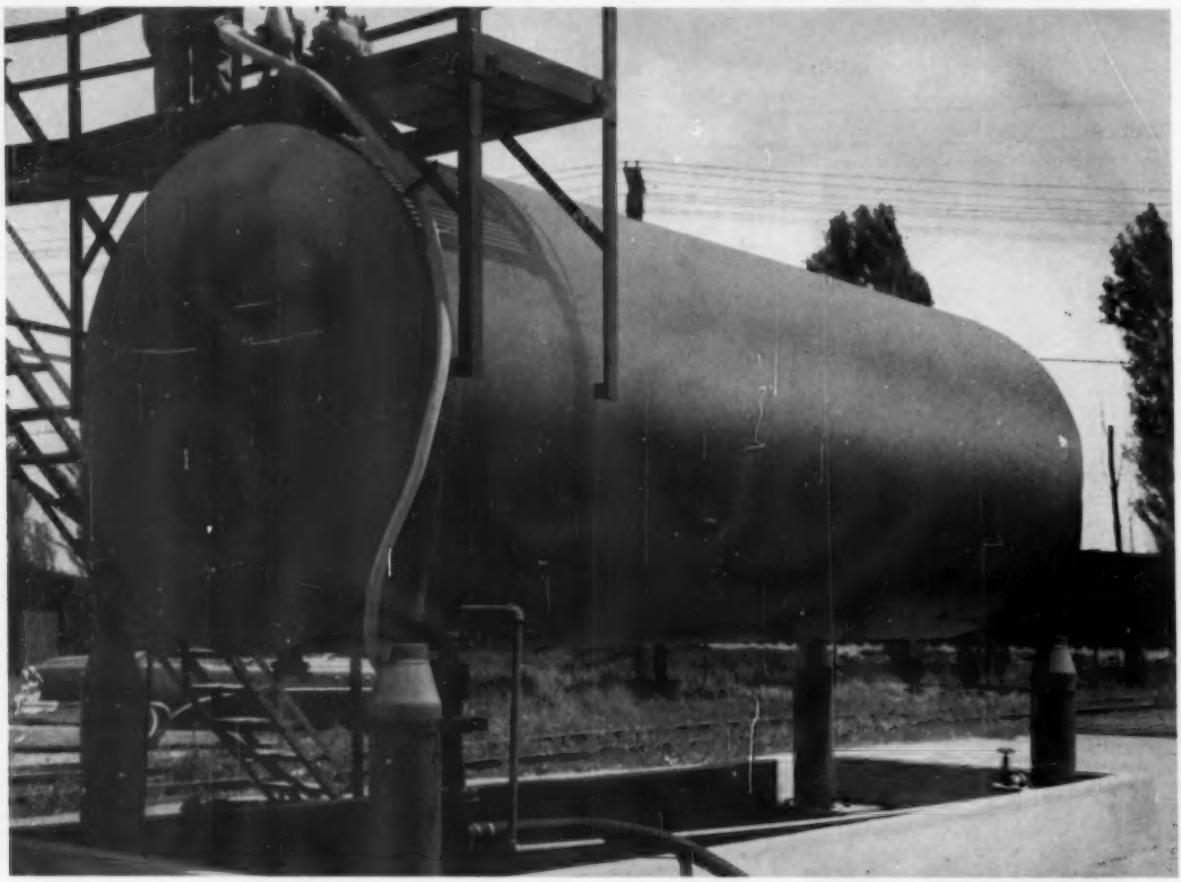
75 years of . . . Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Electro-Chemicals — **BEBR-MANNING DIVISION:** Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

FLUIDICS* AT WORK



Corrosion is no problem when you store in Pfaudler Glasteel tanks.

How to save money when you store corrosives

Consider service life. Consider original cost.

Then stack the performance of this Pfaudler Glasteel storage tank up against any other you can buy. What you'll discover is that this is the tank that saves money when you handle corrosives.

Glasteel gives you *glass* inside for corrosion resistance, *steel* outside for structural strength.

You can use Glasteel with any acid, except HF, and most alkalies without the continuous, costly replacement you've come to expect from many other materials.

Save two ways. With Glasteel tanks up to 10,000 gallons your savings accrue over a period of time, because Glasteel lasts normally up to 20 years or more. Above 10,000 gallons you save on initial cost, too, since these tanks are priced lower than stainless. Half as much as stainless in 30,000-gallon size.

You can get Glasteel storage tanks in horizontal or vertical styles, with capacities from 500 to 35,000 gallons. Openings and nozzle arrangements to fit your needs.

How to find out more. The corrosion resistance of Glasteel is also available in reactors, columns, pipes, valves, and fittings or in complete acid-recovery systems engineered to your requirements. For details on tanks, ask for Bulletin 975; for a look at the complete line, ask for our Fluidics Buyer's Guide. Or write, outlining your needs, to our Pfaudler Division, Dept. PL-120, Rochester 3, N. Y.

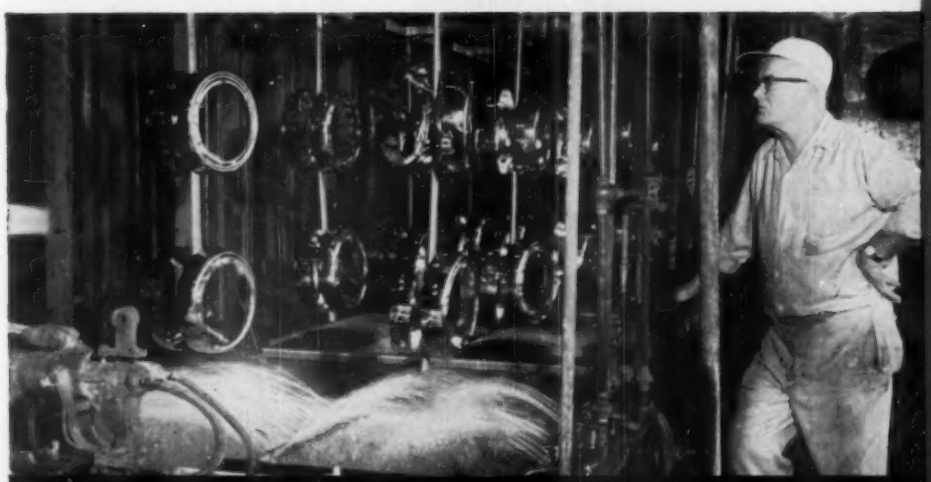
*FLUIDICS is the Pfaudler Permutit program that integrates knowledge, equipment and experience in solving problems involving fluids.

PFAUDLER PERMUTIT INC.
Specialists in FLUIDICS . . . the science of fluid processes

a ***Udylite*** *customer discovers . . .*

HOW TO GAIN 2 MAJOR BENEFITS WITH 1 GREAT NICKEL PROCESS

The incomparable "66"



The Dominion Electric Corporation has made a marked improvement in the appearance and reduced the cost of finishing its products.

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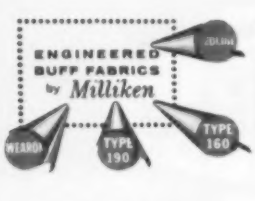

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ARTICLE REFERENCES

By
WILLIAM TUCKER
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Rochester, N. Y.

Most of the articles listed here may be obtained by writing to the publications in which the articles were published. Addresses are given at the end of the references for the reader's convenience.

Photostat or microfilm copies of articles in available magazines may be obtained from: Library of Congress, Washington, D. C.; New York Public Library, New York; Engineering Societies' Library, New York, at prevailing rates. In other cases, consult Wilson's Union List of Serials at your nearest public library for other sources of these articles.

151. ADHESION
SCIENCE FOR ELECTROPLATERS 60. CAUSES OF POOR ADHESION.
L. Serota.
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152. ALLOY
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CONTROLLED DEPOSITS OF HARD CHROMIUM.
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a. *FLUOBORATES IN PLATING.*
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c. *X-RAYS CHECK PLATING THICKNESS—EMISSION AND ABSORPTION METHODS EVALUATE WEAR AND POROSITY.*
R. H. Zimmerman.
The Iron Age, October 13, 1960, *186*, No. 15, pp. 84–87.

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a. *IS YOUR PLATING RECTIFIER DEFECTIVE?*
Robert J. Darrah.
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b. *STEAM: ITS PRODUCTION, CONTROL AND APPLICATION IN METAL FINISHING.*
George Saxby.

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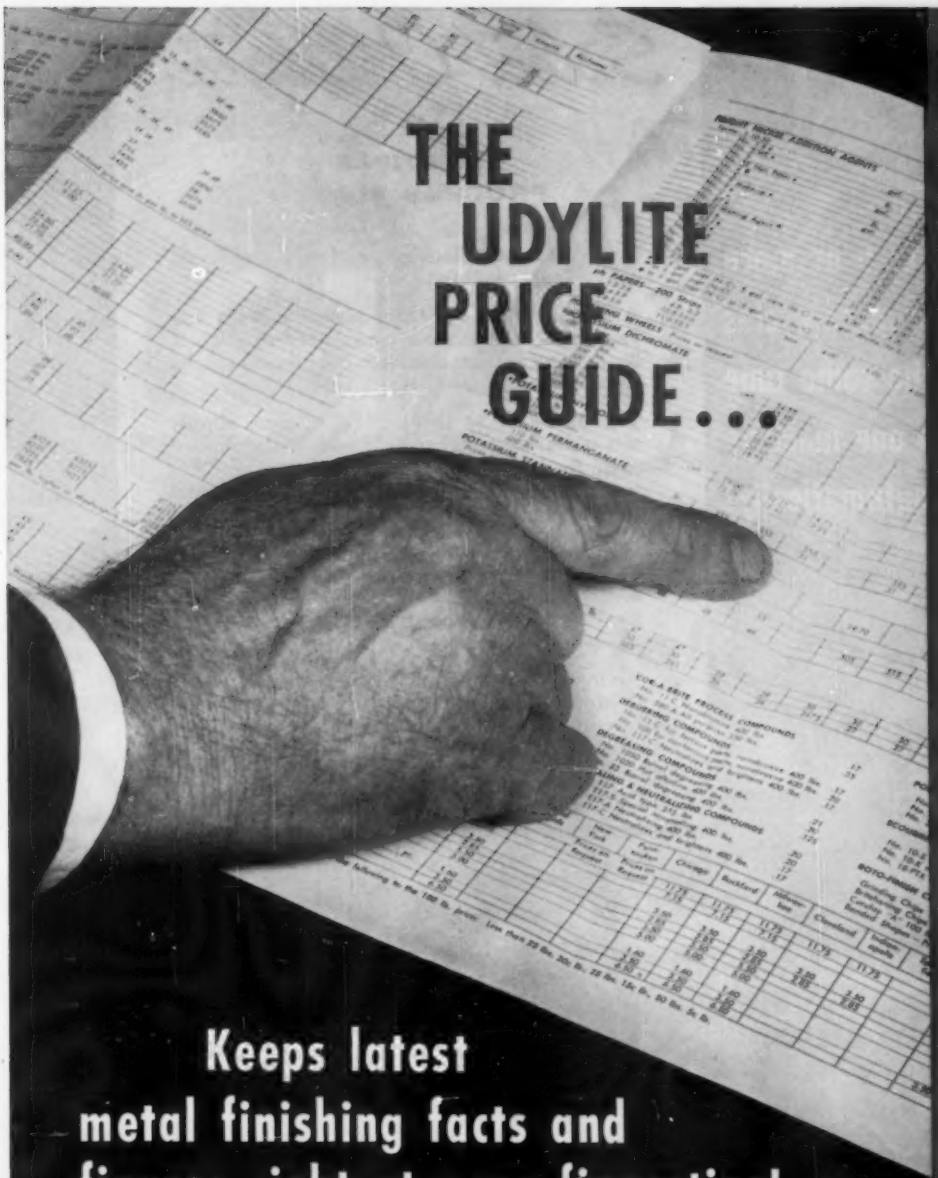

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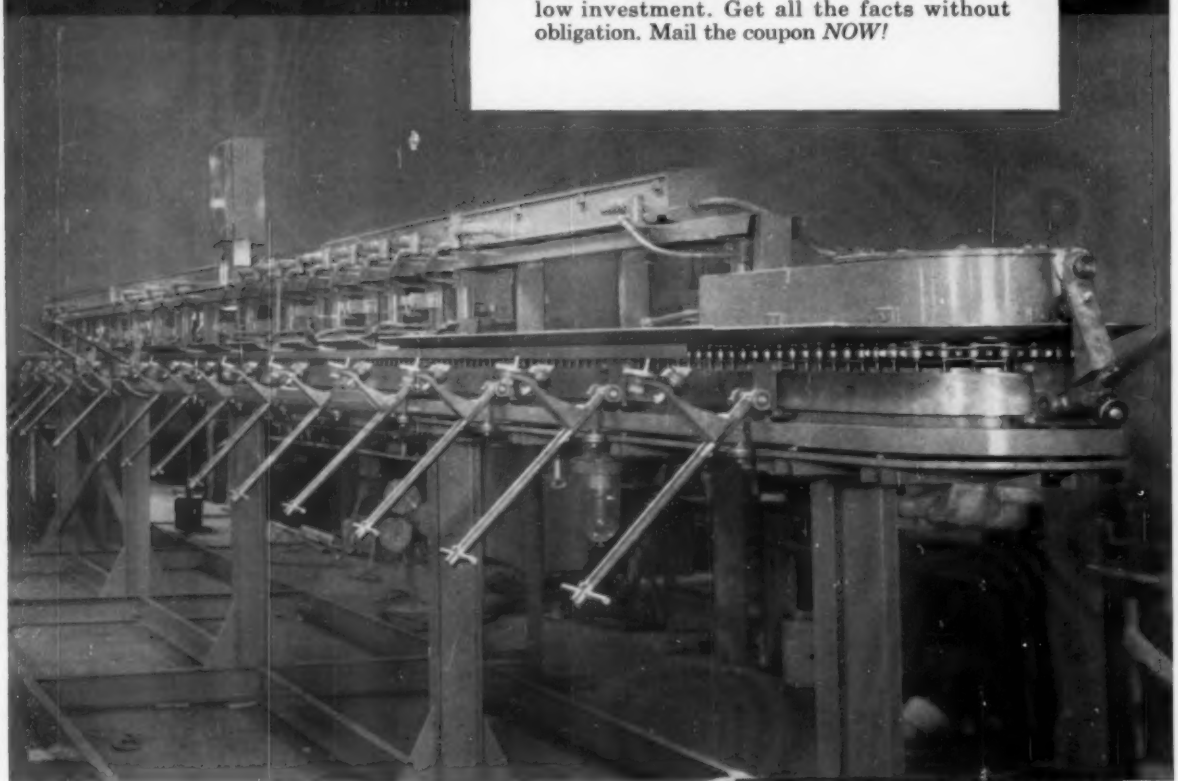

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A detailed technical report appears in the AES Technical Proceedings, 1960 edition.

Lockheed will gladly furnish detailed information on request.

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(1960 EDITION)

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AES Research—Its Purpose and Accomplishments *by J. D. Thomas,* 1959–1960 Chairman, AES Research Committee

Applying Statistical Quality Control to Plating Processes *by Robert W. Steinmetz,* Western Electric Company, Inc.

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THE INTERNATIONALLY awaited 1960 Edition of the annual book, TECHNICAL PROCEEDINGS, of American Electroplaters' Society, Inc. (AES), published in record time, has now made its appearance, and copies thereof are streaming to AES members in good standing far and wide, here and abroad, for whom the annual book is principally intended. And having accommodated its farflung membership with free copies, AES, the book's exclusive publisher, now has a limited quantity of extra copies available for sale to AES non-members, on strictly a "first come-first served" basis so long as that limited supply lasts, so as to share the book's educational benefits.

Comparable in quality to the GOLDEN JUBILEE EDITION of TECHNICAL PROCEEDINGS (1959 Edition) that earned worldwide acclamation in technical, scientific and other educational circles, AES's 1960 Edition, another treasure chest of knowledge on electroplating, metal finishing, organic coating and allied arts, contains the full text of each of the 31 papers delivered by experts before the 47th Annual Convention of American Electroplaters' Society, Inc., held in Los Angeles, California, July 24-28, 1960.

Embodying, too, the charts, diagrams, graphs, tables and other illustrations of each of the 31 published papers, the book also includes the transcript of the discussion that attended the delivery of each paper. A full list of the papers published in this voluminous repository of education appears on the opposite page of this announcement.

The unique book also includes, among other data, a day-to-day log of the Convention; a section on the AES Scientific Achievement Award and on other AES technical and scientific awards and honors bestowed at that first West Coast National AES Convention; a full listing of the Boards and Standing and Special Committees that served the AES during its fifty-first year, and a complete AES Branch Directory.

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♦

The AES was welcomed to California and Los Angeles by Governor Edmund G. Brown and by Mayor Norris Poulson. The entire week of the AES's Convention was, in fact, proclaimed by Los Angeles's Mayor as "American Electroplaters' Society Week in Los Angeles."

♦

Educational Sessions numbered nine. Experts presented 31 technical and scientific papers enriching knowledge in electroplating, metal finishing and allied arts. One Session alone covered organic finishing.

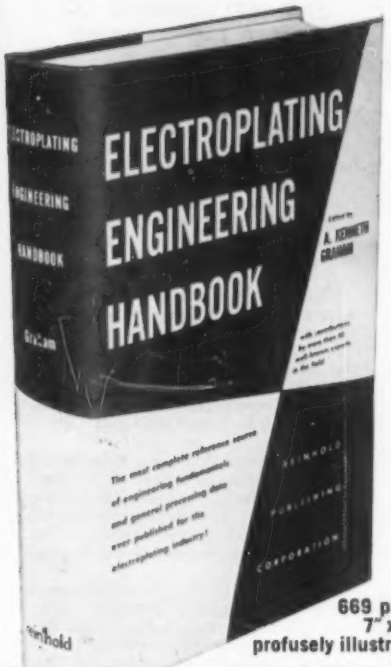
High spots of the Sessions were not only the second annual "William Blum Lecture" that was delivered as the Educational Program's lead-off attraction by Dr. A. Kenneth Graham, 1959 winner of the "AES Scientific Achievement Award", the Society's highest scientific honor, but also the vaunted two-session, eight-paper "Hydrogen Embrittlement in Metal Finishing Symposium." In addition, this Convention also featured the summary of AES Research Projects presented by AES Research Committee Chairman James D. Thomas at one of the Sessions.

♦

Under the active planning and supervision of the AES's Editorial Board itself, the Educational Sessions were programmed for the AES by Host Branch Educational Chairman Earl W. Arnold and his Co-Chairman, David F. Seymour, with Dr. Harold J. Read of Pennsylvania State University, a special member of that Los Angeles Branch Committee, responsible for the "Hydrogen Embrittlement in Metal Finishing Symposium."

OPENING EDUCATIONAL SESSION HEARS 1960 "WILLIAM BLUM LECTURE"

(1) Dr. William Blum introducing Dr. A. Kenneth Graham, deliverer of the 1960 "William Blum Lecture." (2) Attentive audience hears Dr. Graham discuss "Faraday's Laws Applied to Cleaning." (3) Dr. Graham holds "AES Scientific Achievement Award" scroll presented to him by National President Ralph D. Wysong, right, in behalf of American Electroplaters' Society, Inc.



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The unique book contains the full text of each of the 43 technical papers on electroplating, metal finishing, organic coating and allied arts by experts of nine countries, including the United States, England, Canada, Australia, France, Germany, Holland, India and Italy, delivered before the Fifth International Conference on Electrodeposition and Metal Finishing, educational sessions element of the AES's Golden Jubilee Convention held in Detroit, Michigan, June 15–19, 1959.

Embodying, too, the charts, diagrams graphs, tables and other illustrations of each of the 43 published papers, *the book also includes the transcript of the discussion that attended the delivery of each paper.* A full list of the papers published in this voluminous treasure chest of knowledge has been carried in past issues of PLATING MAGAZINE since December 1959, and will gladly be sent to you on request.

Spanning some 400 pages (by far the largest annual TECHNICAL PROCEEDINGS ever published by the AES in its half-century lifetime), this 1959 edition also includes, among other data, a day-to-day log of the Golden Jubilee Convention; a section on the AES Scientific Achievement Award and on other AES technical and scientific awards and honors bestowed at the Golden Jubilee Convention; a full listing of the Boards and Standing and Special Committees that served the AES during its Fiftieth Anniversary year, and a complete AES Branch Directory.

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INTERNATIONAL CONFERENCE: ITS AES HALF-CENTURY SETTING

DRAMATIC and fitting climax of its year-long FIFTIETH ANNIVERSARY observance, American Electroplaters' Society, Inc. (AES) conducted its unique Golden Jubilee Convention and Industrial Finishing Exposition, including the concurrent Fifth International Conference on Electrodeposition and Metal Finishing, in Detroit, Michigan, June 15-19, 1959.

GREETED by the President of the United States, the AES was welcomed to Michigan and Detroit by Governor G. Mennen Williams. The entire week of the AES's Convention, Exposition and International Conference was proclaimed by Detroit's Mayor as "AES GOLDEN JUBILEE WEEK IN DETROIT."

AS the Fifth International Conference on Electrodeposition and Metal Finishing, the Golden Jubilee Convention's educational sessions numbered eleven. Experts from nine countries, including the United States, England, Canada, Australia, France, Germany, Holland, India and Italy, presented 43 technical and scientific papers enriching knowledge in electroplating, metal finishing and allied arts. High spot of the sessions was the first "William Blum Lecture" that was delivered by the eminent Dr. William Blum, first winner of the AES Scientific Achievement Award, the Society's highest honor.

UNDER the supervision of the AES's Editorial Board, in collaboration with the International Council on Electrodeposition and Metal Finishing, the International Conference was planned for the AES by AES Past President Walter L. Pinner, Chairman of the International Council. His Committee included Dr. T. P. Hoar, Dr. Simon Wernick, A. W. Wallbank, R. A. F. Hammond and George Gardam of England and Myron B. Diggin, Dr. Walter R. Meyer and Dr. Richard B. Saltonstall of the United States.

OPENING SESSION OF THE FIFTH INTERNATIONAL CONFERENCE ON ELECTRODEPOSITION AND METAL FINISHING

(1) Chairman Walter L. Pinner extending official welcome. Dr. William Blum, AES Scientific Award winner, seated. (2) Crowded auditorium at the first session. (3) Session Chairman T. P. Hoar introducing Dr. Blum, who delivered the first William Blum Lecture.

CONTENTS, 1958 EDITION

The Role of the Basis Metal in the Production of Stressed Electrodeposits by *Dr. Joseph B. Kushner*, Kushner Electroplating School

Effect of Shot-Peening Prior to Chromium Plating on the Fatigue Strength of High Strength Steel by *Bennie Cohen*, Wright-Patterson Air Force Base

Loose Abrasive Finishing Machines by *Fred T. Hall*, General Motors Corporation

AES Project No. 14—The Influence of Physical Metallurgy and Mechanical Processing of the Basis Metal on Electroplating
V: Effect of Polishing on the Durability of Nickel Plated Mild Steel by *Dr. Maurice H. Jones and J. Zajdowski*, Ontario Research Foundation

Metal Wastes—Contribution and Effect—Cincinnati Metropolitan Sewage Disposal Service Area by *Fenton H. Dobb*, City of Cincinnati (Sewage Disposal Section)

Ion Exchange and the Pickling of Magnesium Sheet by *Robert E. Anderson*, The Dow Chemical Company

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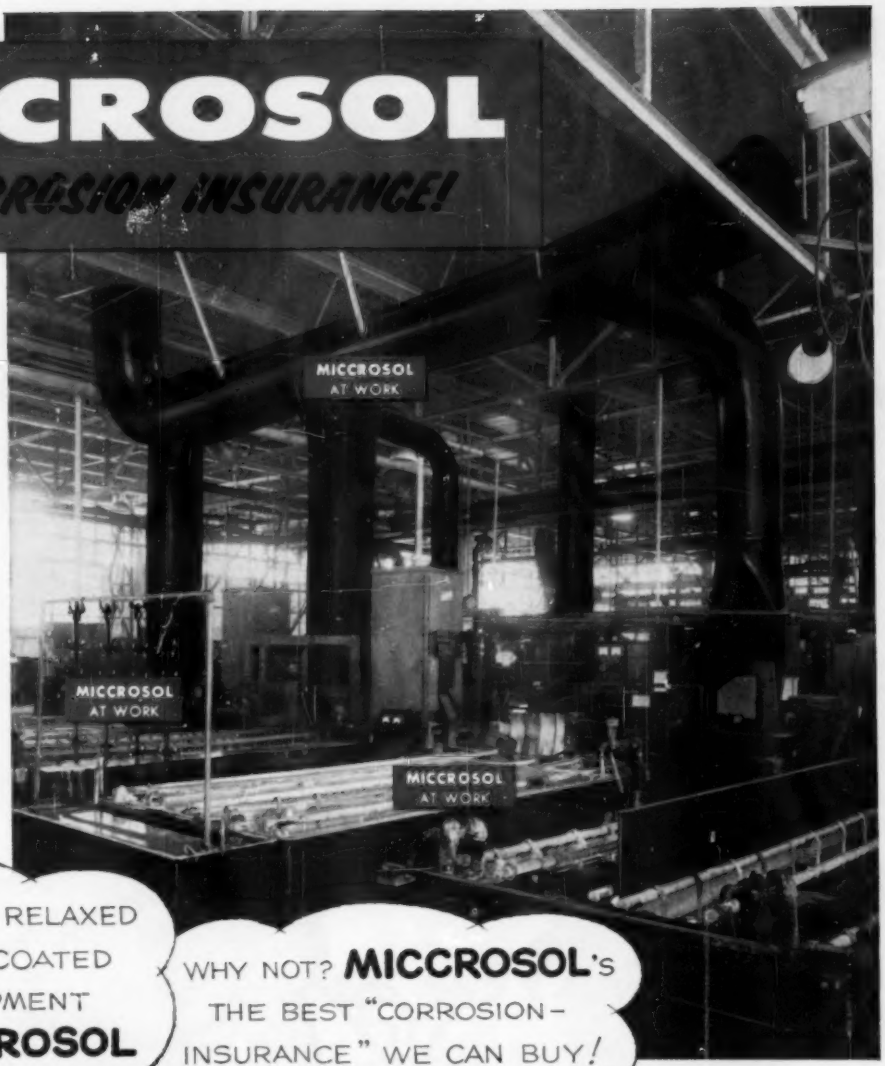

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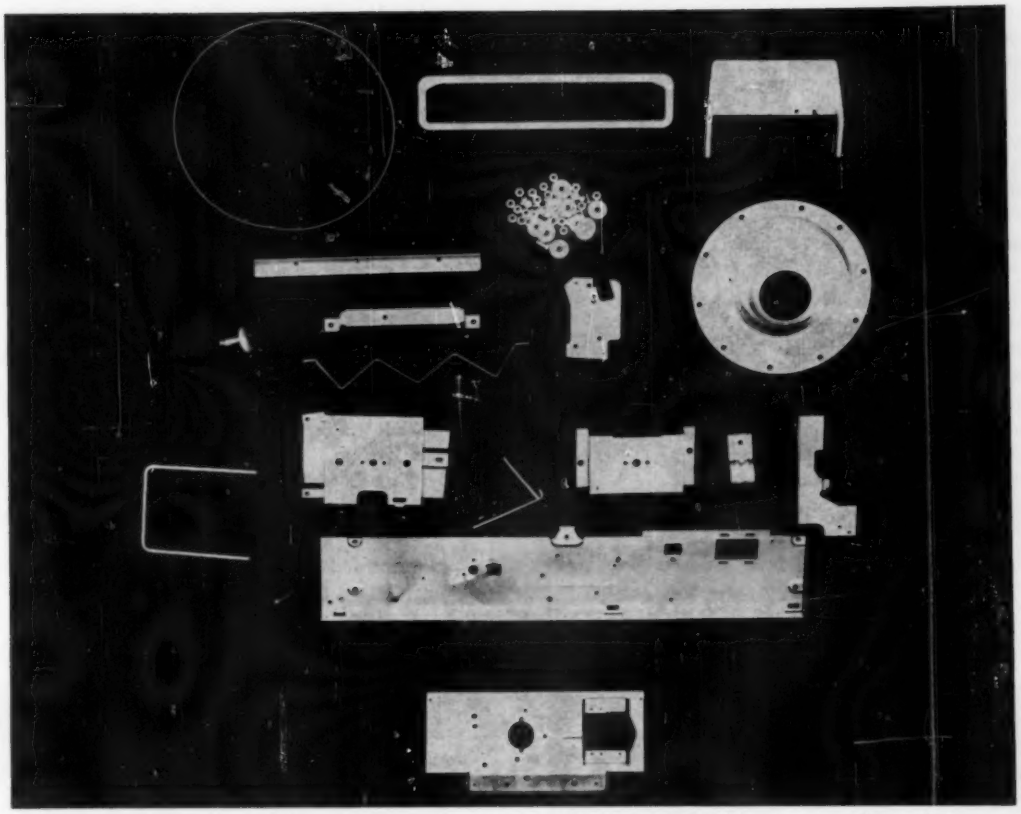

Fig. 1. A group of typical home laundry appliance parts which are rustproofed by zinc or cadmium plating. None of these parts are directly exposed to the alkaline washing compound.

CHOOSING BETWEEN ZINC AND CADMIUM ELECTROPLATE FOR CORROSION PROTECTION OF MAJOR APPLIANCE COMPONENTS

by **STANLEY J. BEYER***

ZINC AND CADMIUM COATINGS have many similar properties. The applications which make the selection of one coating preferable to the other are summarized concisely as a reference for design engineers in the appliance industry.

Zinc and cadmium coatings are very much alike in appearance and in the protection they afford to steel parts subjected to outdoor atmospheres or high humidity. In general, neither zinc nor cadmium will serve to protect steel adequately when exposed to actual contact with corrosive chemicals (e.g., battery acids, dishwashing compounds, etc.) or to temperatures over 500F (e.g., in such application as oven broiler parts or heating element support brackets).

The protection afforded by zinc and cadmium coatings exposed to various atmospheres is sacrificial and is practically proportional to the thickness.[1] They are especially good rust protective coatings on steel where moisture is not confined and evaporates readily. Clear, irridescent, olive drab and other chromate conversion coatings can be used to further improve corrosion resistance. Pocock[2] has given a comprehensive review of these types of chromate coatings. Supplemental phosphate coatings on zinc and cadmium provide an excellent base for paint where additional protection is desired.[3]

In general zinc will serve as well as cadmium and should be specified because of its lower cost. Cadmium is approximately $1.50/lb. Zinc is $0.18/lb. Of course the metal cost is not the whole cost so that often cadmium plated parts can be procured for only slightly more than zinc plated parts.

*Finishing Systems Laboratory, Major Appliance Laboratories, General Electric Company, Appliance Park, Louisville 1, Kentucky.

Neither zinc nor cadmium plated items should be used as food containers. Cadmium salts are extremely toxic. McCord and Pendergast[4] report that as little as 35 milligrams of cadmium ingested "may produce distressing manifestations." For this reason cadmium plating should never be specified for any parts which are even likely to be in contact with food. Zinc salts on the other hand are far less toxic and although zinc should not be used in direct contact with food, items such as zinc plated welded steel wire refrigerator shelves (with a clear organic coating) present no danger from toxicity and have been used for many years.

Emphasizing again that zinc should be specified generally because of its lower cost and equivalent protection, the following properties make cadmium useful and preferable to zinc for special applications.

1. Cadmium is more ductile than zinc. This property may make cadmium more desirable for parts which have to be formed after plating, although zinc is sufficiently ductile to take limited forming.
2. Freshly plated cadmium is easier to solder than zinc, so it is preferred for all soldering applications.
3. Cadmium plated screws exhibit the property of requiring less torque to drive than zinc plated screws.
4. Cadmium plated electrical contacts retain a high surface conductivity longer than zinc and are definitely to be preferred for contact points. (Not, however, in preference to silver plated contacts.)
5. Although with normal pre-plating procedure, both cadmium and zinc plated spring steel parts are embrittled by hydrogen absorption, cadmium plating of itself does not contribute measurably to that embrittlement.[5] In any case where hydrogen embrittlement is a factor, zinc or cadmium may be used with a preference for cadmium, but parts should be baked soon after plating at a time and temperature sufficient to relieve the embrittlement due to absorption of hydrogen. Usually no higher temperature than 400 or 450F for a time varying from one hour to 24 hours is required; time and temperature depending on the base metal, the plating thickness and the hydrogen absorbed. Usually some flexing or cyclical stress test is applied to determine how much time is required to relieve a particular part.
6. Cadmium is often preferred for marine application because of its non-crusting corrosion products.[6]

Figures 1, 2 and 3 illustrate typical uses for zinc or cadmium electrodeposits in the major appliance industry.

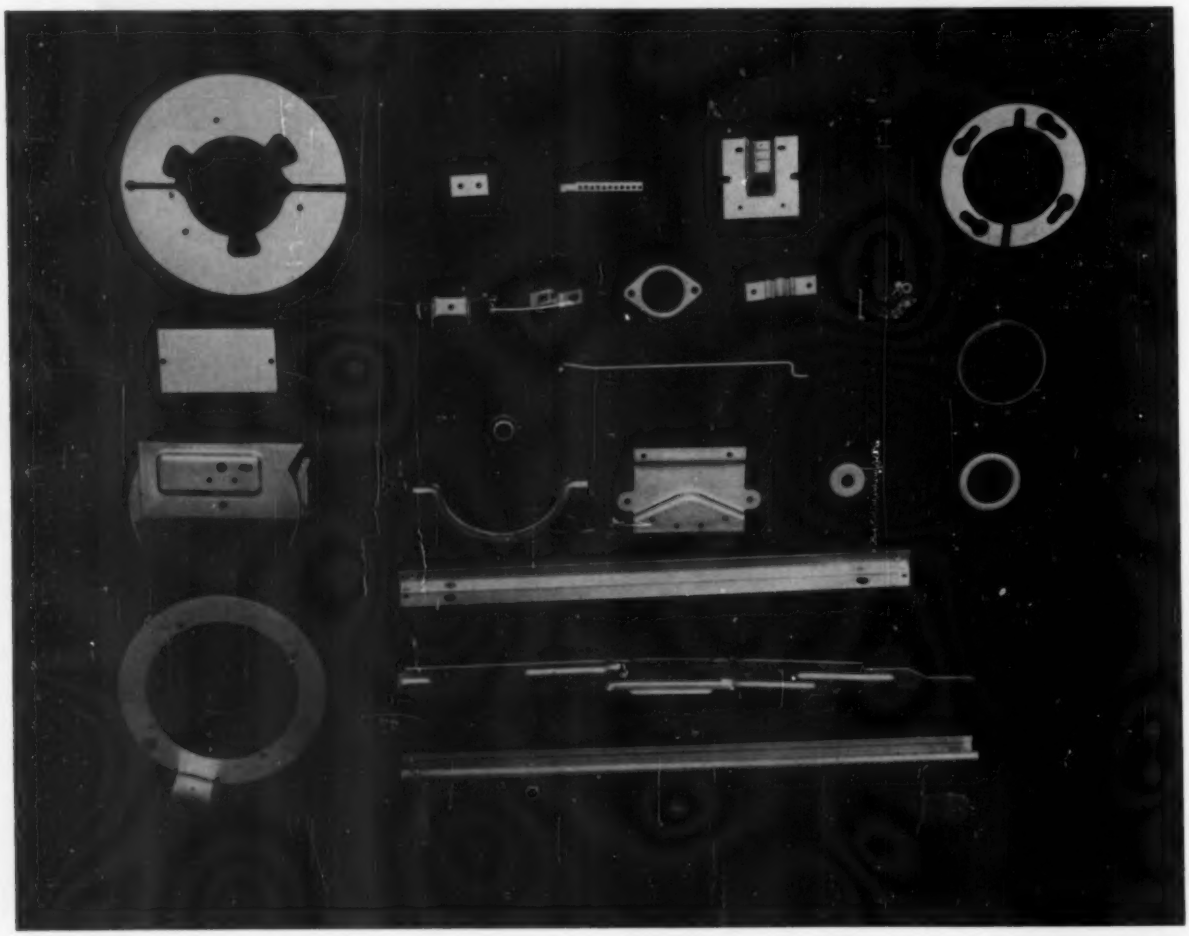

Fig. 2. A group of typical dishwasher and disposal parts which are zinc plated. None of these parts are directly exposed to the alkaline washing compound.

Fig. 3. A group of typical refrigerator parts which are rustproofed. The majority of the parts are zinc plated with a subsequent chromate treatment for additional protection.

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[6]Holls, E. E., "Metallurgia," **35,** 1946, p. 30.

Stanley Beyer was born in Plainfield, New Jersey in 1921. He graduated from the University of Michigan in 1942 with a BSE degree in chemical engineering. He began his career as a process engineer for the Curtiss-Wright Corporation and after the War he worked for the Buffalo Plating Company, job electroplaters, in Buffalo, New York. He joined General Electric in 1951, working first as a manufacturing process planner, later as a foreman of plating and painting, then process planner in an Advanced Manufacturing Development section followed by a special assignment as an electroplating specialist and is presently a chemical engineer in the Finish Systems Laboratory of the Major Appliance Laboratories. After joining AES in Buffalo, he was instrumental in forming the Louisville Branch, has served in all of its executive offices and is presently on the Board of Managers.

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3. The oxide contains millions of tiny pores per square inch before sealing; pores which will take on dye among other things.
4. The pores may be sealed by boiling the aluminum in water.

These features are the most important as far as decorating is concerned and should be kept constantly in mind. The first is a physical characteristic and has very little to do with appearance.

For best results high purity aluminum should be anodized to a coating depth of two tenths of a mil preferably by the Alumilite* process. After anodizing, the parts should be rinsed to wash off the acid but not sealed. This means that the pores on the surface of the parts are open and ready to receive dye.

*Aluminum Company of America, Alcoa Building, Pittsburgh 19, Pennsylvania

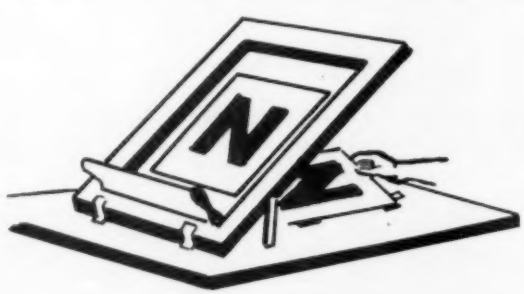

Fig. 1. Printing

*Consultant, Parma Heights 30, Ohio.

At this stage, the appearance of the parts should be no different from unanodized work because the anodic film is transparent. If the part had a highly polished surface before anodizing it should retain it. If the finish had a satin appearance it will remain that way. Once the anodizing is properly done the process can begin.

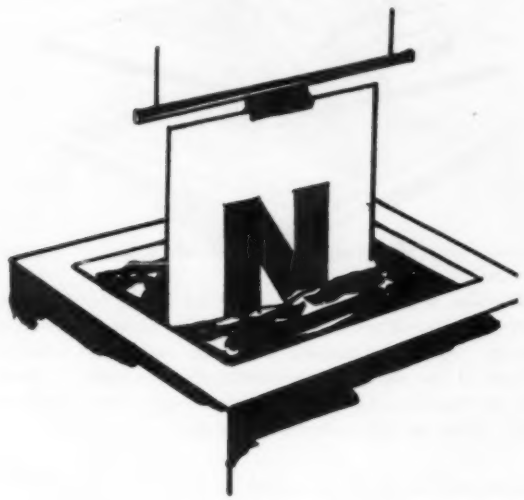

Fig. 2. Dyeing

COLORING ALUMINUM

The dyes generally used for the coloring of anodized aluminum may be obtained from most of the major manufacturers of dyes. They are termed aluminum dyestuffs. Some manufacturers have color charts available showing the shade that various concentrations of their dyes will give. These dyes come in powder form and are simply mixed with water in the proper concentrations. Some have to be adjusted with acetic acid or ammonia for pH but at least one manufacturer offers a range of dyes which are buffered and require no adjustment after mixing. The dye solutions may be heated as high as 150F in some instances to obtain the desired light fastness. When anodized work is rinsed in clear water and immersed in the dye for five to fifteen minutes a good even dyeing should take place. This will color all the exposed surfaces.

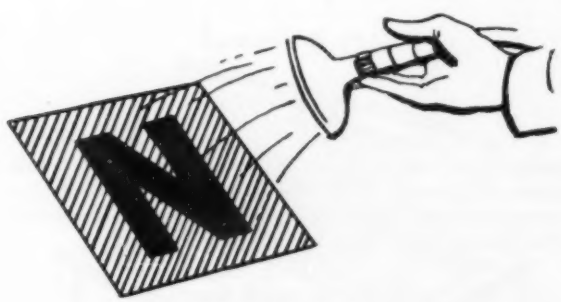

Fig. 3. Rinsing

HOW TO DECORATE

The above elementary explanation of how to dye an aluminum object is for background material. The object of this article is to show a simple method of dyeing certain select areas using one or more colors.

The simplest type of decorating is done as aluminum lettering or design with a colored background. Any of several methods may be used to print ink on the part. For the sake of simplicity silk screen printing has been chosen to illustrate the principles.

The anodized unsealed part which has been thoroughly rinsed and dyed is printed with lacquer through a silk screen stencil in all the areas to remain the clear aluminum color. In effect, the minute pores in those areas of the anodic film are covered so that they cannot receive dye. When the lacquer is dry, the part is immersed in a dye solution of the desired color for ten minutes. All areas not covered by the lacquer will take dye. The excess dye is rinsed off with water. (This is very similar to dyeing patterns on Easter eggs.) At this point if the lacquer were to be removed with solvent, the color under the lacquer would be natural aluminum and the background would be the dyed color.

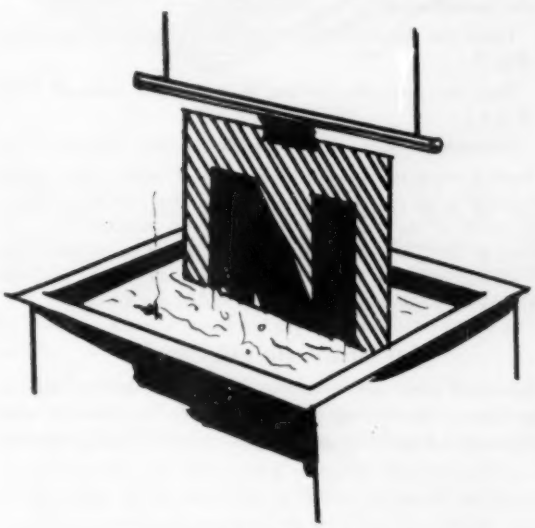

Fig. 4. Sealing

SEALING THE PORES

In actual practice the lacquer is not stripped after dyeing, since the pores containing the dye are still open the dyeing is not permanent. Boiling in water for one-half hour will close the pores, trapping the dye permanently in the transparent anodized coating. It will also seal the pores under the lacquer and render the entire surface resistant to most solvents. After the printed lacquer is removed from the part, the results are a permanent markings of extreme durability. Both the dyed and undyed portions are on the same plane.

Fig. 5. Stripping

ONE COLOR WORK

Five operations for one color work are illustrated in the first five figures.

Print with any lacquer the anodized unsealed part in all areas that are to remain silver (aluminum) and allow to dry. (Fig. 1.)

Rinse in clear water and immerse the parts in a dye bath of the proper color. This will dye the background but not the printed area. (Fig. 2.)

Rinse the sheets in clear water to remove the excess dye. (Fig. 3.)

Seal the pores by boiling in water for one-half hour (Fig 4.)

Strip the lacquer with a suitable solvent. (Fig. 5.)

Sealing must be done in boiling water rather than nickel acetate or other fast sealing solutions. The reason for this is that some of the areas are covered with lacquer and heat sealing at 212F is required to impart a minimum requirement for sealing in those areas. Surprising enough the seal obtained is very good even under the lacquered areas.

METHODS OF PRINTING

Anodized areas are receptive surfaces for inks of almost any type. Decorating can successfully be done by any method of transferring ink. This includes hand painting, rubber stamp, silk screen, letterpress, offset and even rotogravure.

The idea is to get a good greasy ink image on the part. Very few inks will not effectively mask the pores for selective dyeing. Synthetic enamels, however, should be avoided because of the heavy solvent content. This tends to bleed into the pores around the printed areas and cause a haloing effect. They are also quite hard to strip.

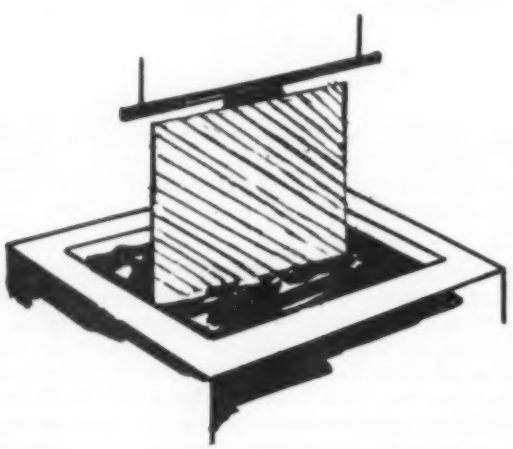

Fig. 6. Dyeing

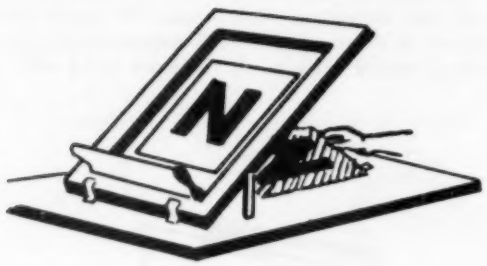

Fig. 7. Screening

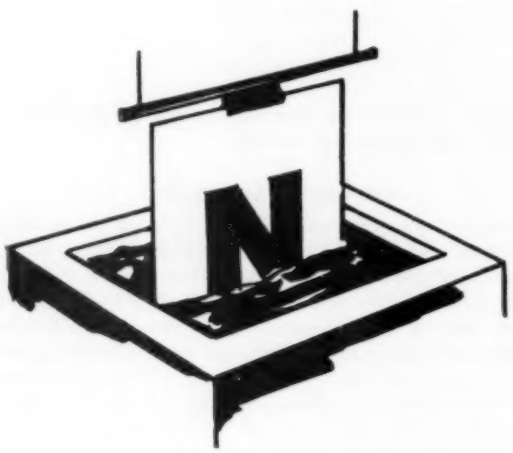

Fig. 8. Bleaching

It is quite practical to have the printing done outside especially if silk screen process is used. If silk screen printing is used, it is possible to decorate tubular and even compound contours without much difficulty. Other commercial methods of printing generally must be confined to flat sheets.

MULTI-COLORED DYEING

To understand how multi-colored dyeing is accomplished, the following should be kept in mind:

1. The anodic film may easily be dyed before sealing.
2. Most dyes may be removed either by an acid treatment or bleach.
3. The bleached areas may be dyed another color.
4. The dyeing bleaching cycle may be performed many times without much loss in anodic film if done carefully.

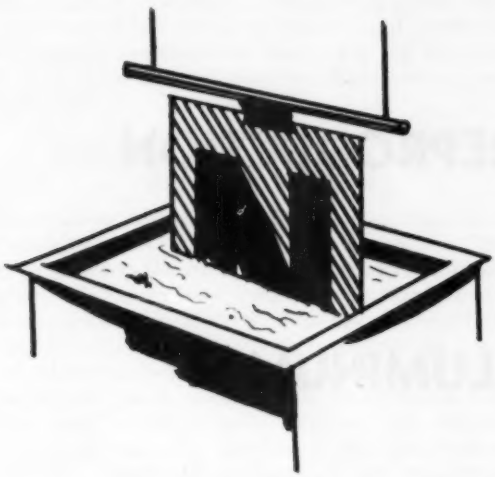

Fig. 9. Dyeing second color.

There are two ways of starting multiple dyeings and the method chosen depends on the designs and colors in the copy. In the first instance the start is exactly like the one-color dyeing described. The clear anodized area is printed with all the copy to remain the natural color. The background is dyed. After drying, copy is printed in the dyed area. The part is bleached leaving the colored portion under the lacquer. A ten per cent solution of warm household bleach will do an excellent job on most dyes. It is safe, fast and seems to have no effect on the anodic film. The part is thoroughly rinsed in clear water and the background is then dyed a second color. If the part were to be sealed and stripped with solvent at this time there would be clear aluminum areas (first printing), copy of one color (second printing) and background of a second color, (dyed background).

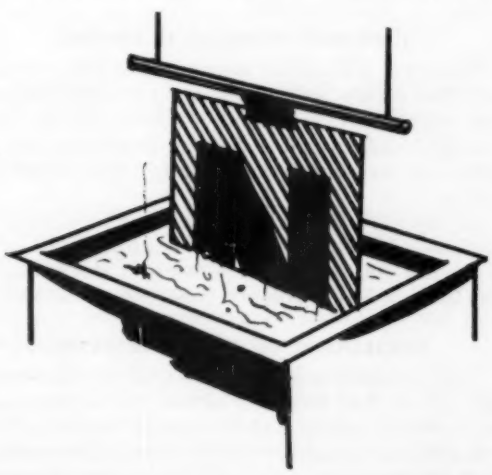

Fig. 10. Sealing

AN ALTERNATE METHOD

The alternate method is started off by dyeing the part completely one color. (Fig. 6.) The areas which are to remain this color are printed (Fig. 7). The background is bleached (Fig. 8) in warm 10 per cent household bleach. The part is rinsed and dyed another color (Fig. 9). Then the part is sealed (Fig. 10). Following this procedure, the ink is stripped off using a suitable solvent (Fig. 11). At this stage the part which was under the ink is one color and the background another color. The printing, bleaching and dyeing cycle may be carried on until the desired number of colors are obtained.

Complete bleaching will usually take place in a matter of seconds and not injure the anodic film. Some colors bleach more readily than others especially when dyed at lower temperatures, therefore, some experimentation should take place before a manufacturing sequence is set up. As a general rule yellow is difficult to bleach and gold is almost impossible to remove. These two colors therefore should be saved as last colors.

Fig. 11. Stripping

The method described is one involving very little equipment readily available to any anodizer. The printing can be done by an outside source with a minimum of supervision and very often at very little added cost over that of a color-anodized part. It is one of the very few attractive permanent markings available today and the only one in brilliant colors. The uses range from name plates to coffee pots.

Ralph A. Botosan is a free lance consultant to industry. He has developed many electrochemical processes used in the marking, decorating and coloring of metals. His articles on various electrochemical processes have appeared in many of the leading technical magazines both here and abroad. His field includes color anodizing, metal decorating, name plates and printed circuits. As a hobby, he pursues the investigation of the effect of electrochemical processes on glass and ceramics. He is assistant librarian of Cleveland Branch, AES.

PHOTOGRAPHIC REPRODUCTION ON ANODIZED ALUMINUM

by A. JOGARAO, K. S. INDIRA and B. A. SHENOI*

ABSTRACT

An absorbent layer of aluminum oxide produced by anodic oxidation of aluminum (in a suitable electrolyte such as sulfuric acid or chromic acid) can be used as the sole carrier for the photo sensitive substances to produce reproductions of all kinds such as scales, dials, etc. used in instruments. These photographic processes are less costly and less time consuming as compared with the laborious engraving processes. Various techniques for printing permanent design by photographic reproduction processes on aluminum of >99.5 per cent purity (2S) are described in detail.

INTRODUCTION

ANODIC OXIDATION, commonly known as *anodizing*, is an electrochemical process of building up the aluminum oxide film on aluminum surfaces to the required specifications. The grain size, porosity and thickness can be varied by varying the conditions of electrolysis like current-density, temperature, duration and the composition of the electrolyte. Color and nature of the film also depend upon the composition of the aluminum or its alloys.

INITIAL SURFACE PREPARATION

The article must be perfectly cleaned and degreased before it is anodized. A satisfactory sequence for cleaning and degreasing may be as follows:

(a) Degrease in the vapor of trichloroethylene,

(b) Immerse in an inhibited non-etching cleaner such as aqueous solution of 2 oz trisodium phosphate and 4 oz sodium metasilicate crystals per gallon at 90–95C,

(c) Rinse in cold water,

(d) Dip in 5 per cent nitric acid and neutralize traces of alkali if any.

Or alternatively, electrochemical cleaning may be adopted.

ELECTROCHEMICAL CLEANING

The article is made the cathode in the bath containing one to two per cent sodium hydroxide solution and is treated at a voltage of 12–16 volts for 30 seconds, current density being 35–75 asf. A cold wash dip in 10 per cent nitric acid removes the traces of alkali and finally a rinse in cold water is given.

For anodic film required for photographic reproduction, conditions of anodizing are slightly changed in order to have an adhering surface absorbent neither too coarse to make the print hazy nor too fine so as to be impervious to the chemicals.

MECHANISM OF FILM FORMATION

When aluminum is made the anode in an electrolyte like sulfuric acid, lead being the cathode, the oxygen evolved reacts with the aluminum to form aluminum oxide layer.

However, simultaneously with the electrolytic formation of the oxide coatings on aluminum, there is a tendency for chemical dissolution of the outer layer of the coating, thereby causing it to become somewhat porous. As electrolysis pro-

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ceeds, the rate of formation of aluminum oxide coatings equals the rate of dissolution in sulfuric acid and an equilibrium is established under the experimental conditions. This determines the maximum thickness of the aluminum oxide that can be achieved under specific conditions for a particular bath.

GENERAL CHARACTERISTICS OF ALUMINUM OXIDE FILM

The aluminum oxide present on the surface of aluminum after anodizing is considered to consist of three layers. That which is nearest to the metal is harder and more compact, being called the barrier layer, while the intermediate layer is porous and not so compact, the third and top most layer being the "bloom" which can be fairly easily rubbed off. By proper control of the conditions of anodizing, the formation of bloom can be avoided. Oxide coatings developed on aluminum by "sulfuric acid" anodizing have corrosion- and abrasion-resistance properties which vary linearly with film thickness and density. These comprise thin and fairly transparent layers of hard Al_2O_3 which are strongly adherent and afford considerable protection. The films have good absorptive properties.

PROCEDURE

These processes (photographic) consist of depositing the light sensitive substances into the pores of anodic film of aluminum.

The light sensitive substances are introduced into the film as is done in the usual dyeing processes. Both sulfuric acid and chromic acid coatings may be employed for the photographic processes, and the work may be either immersed in a solution of photosensitive material as in blueprint process or by precipitation methods where the photosensitive material is insoluble as in silver halide process.

OPTIMUM CONDITIONS OF ANODIZING

As mentioned early, the conditions of anodizing are slightly changed to have a film of aluminum oxide suitable for photographic process.

Electrolyte	Sulfuric acid
Concentration of electrolyte	15% v/v
Voltage	14–15 volts
Time of treatment	55–60 minutes
Temperature	24C ± 1C
Al Alloy used	Indal 2S > 99.5% purity

The current is maintained throughout the process.

BLUEPRINTING

The blueprint process used for blueprint paper is found to be quite satisfactory for use on "anodized aluminum" to give sharp contrast pictures in blue and white.

The sensitive solution consists of a mixture of 15 per cent (by weight) potassium ferricyanide and 15 per cent ferric ammonium citrate (Brown).

The freshly anodized (sulfuric acid anodized aluminum of 99.5 per cent purity) plate is immersed in the "Blueprint" solution for two to three minutes. In order to drain out the superfluous liquid adhering to the plate, it is partially dried in dark followed by further drying, by blowing air or by means of a cotton swab or chamois. The sensitized plate is kept under a negative and exposed to sunlight or an arc lamp, the duration of exposure depending upon the intensity of light and the negative used.

The action of light is to reduce part of the ferric salt to the ferrous state which reacting with ferricyanide forms prussian blue.

$$K_3 Fe^{+++} (CN)_6 + Fe^{++} \text{ citrate} \rightarrow [K\ Fe^{++}]\ Fe^{+++} (CN)_6 + \text{Potassium citrate}$$

DEVELOPER

The sensitized plate is developed by dipping in one per cent nitric acid solution which intensifies the image and dissolves out the excess salt. The plate is once again washed with distilled water and dried. No "hypo fixing" as in conventional photography is necessary.

The colors obtained in this way may be modified by some chemical treatments.

1) To get "Pale Blue Tone" the plate can be treated with one per cent solution of cold potassium dichromate.
2) To get a dark or brown tone the plate can be treated to a predetermined temperature. A black tone, though not so stable can be obtained by treating with a 10 per cent solution of sodium sulfide at a *p*H of 8–9.
3) The plate can be colored by dipping in a suitable "coloring media" viz., 0.2–0.6 per cent solution of organic dyes will suffice.

DYEING TECHNIQUES

The factors that influence the depth of the tone (of coloring) are:

Temperature of dye liquor, *p*H, duration of dyeing and concentration.

Too high temperature results in poor adsorption and pore-sealing. The best results are obtained at 75 ± 5C yielding good productivity level dyeings and the limiting time being three to five minutes.

Additions of two per cent tartaric acid were made to the (photosensitive solution)—"Blueprint solution" and the resulting prints are more pronounced, though slightly of a different blue in color. The prints obtained by this process, can be sealed by exposure to boiling water for an hour.

The important feature of the blueprint on anodized aluminum is its permanency.

GELATIN EMULSION PROCESS

In this technique, use is made of gelatin emulsions which are normally more sensitive than those made with colloidion. The gelatin has a two-fold function. It acts as a vehicle for silver halides and as a protective colloid preventing their spontaneous reduction by an alkaline developer. The photographic emulsion used for photoprinting on anodized aluminum is prepared as follows:

Solution A:

Potassium Bromide	10–18 g
Potassium Iodide	0.1–0.7 g
Gelatin (Photographic)	10 g
Distilled water	100 cc

Solution B:

Silver Nitrate	15–26 g
Water	100 cc

Solution A is prepared by dissolving gelatin completely and then adding the other ingredients one after the other and heating to 50C. Solution B at 50C is added to A slowly through a fine jet, taking 15 minutes followed by mechanical stirring.

The mixed emulsion is digested for 15–30 minutes cooled and set. It is then ripened at 65C for nearly 15–20 minutes. A further quantity of 3 grams of gelatin is added to this emulsion and is allowed to set at a temperature of 15C and the set emulsion is cut into shreds. The emulsion is then heated to 50C for half an hour and cooled to 35 ± 1C. To this is added 0.5 cc of 2.5 per cent chrome alum and 0.5 cc of 10 per cent potassium bromide. It is then left overnight (at 15C) and is ready for coating on anodized aluminum. The conditions of anodizing are the same as for "Blueprint process." After drying, it is exposed through a negative, developed and fixed in the usual manner. The plate is heated to 200C for five hours to convert the gelatin into enamel, which makes the print harder and more water-resistant. Sealing is not necessary. The print is black in color and is more permanent.

SILVER NITRATE PROCESS

In these techniques, the photosensitive substance silver halide is produced by double decomposition in the film itself to give rise to dense images after development.

After anodizing, the plate is rinsed in cold water. The dried coating is then dipped in a solution of two to three per cent ammonium chloride and two per cent tartaric acid and after draining the plate is again dried. The plate is again dipped in a solution of two per cent silver nitrate and 0.005 per cent nitric acid. This operation is carried out in darkness. Insoluble silver chloride is precipitated in the anodic coating. The plate is dried and exposed to the light under a negative. The plate is then developed in the physical developer. The image is fixed in a standard "hypo" solution under a yellow safe-light and the film is then sealed.

The process has considerable disadvantages. In order to incorporate sufficient silver halide, it is found to be necessary to repeat the precipitation reactions a number of times. Unless due care is taken, there is a tendency of fogging. Often the results are not reproducible.

SEPIA TONE TECHNIQUE

The nature of the oxide film formed depends mainly on the type of electrolyte used. The film thickness depends upon the voltage used. If the electrolyte has no solvent action on aluminum oxide, a compact film will be formed. Thus chromic acid has no solvent action on the film formed as compared to the sulfuric acid. In the chromic acid anodizing processes the film obtained has less number of pores but of larger pore size. The film formed by this process is opaque and light grey in color. The anodizing treatment provides the aluminum with the necessary absorbent surface to take the photosensitive salts. Chromic acid anodized plates >99.5 per cent Al were found to be suitable for Sepia tone printing. The bath for anodizing the plates consists of 10 per cent chromic acid solution and is worked at a temperature of 40 ± 1C for two hours at a voltage of 30 volts, aluminum plates of similar area being used as cathode.

The plates are thoroughly washed in distilled water for nearly 15 minutes till the last trace of chromic acid absorbed is removed (indicated by the color of the plate turning white from yellow).

The plate is dried and the surface is impregnated with the photosensitive solution. Here the solution consists of the following:

A. Silver nitrate	100 g/l
B. Ferric ammonium citrate	250 g/l
C. Tartaric acid	50 g/l

Equal volumes of solution A, B, C are made. Solutions B and C are mixed, slowly with constant stirring and then solution A is added slowly. After drying the plate is exposed to the light under a negative for two to three minutes. Before exposing to light the plate is yellow in color and after exposure it develops a brown color. The plate is then developed by dipping in the working developer.

Developer:

Solution A:

Metal	7 g
Hydroquinone	7 g
Citric acid	7 g
Water to	1 l

Solution B:

Silver nitrate	40 g
Citric acid	40 g
Glacial acetic acid	40 cc
Water to	1 l

WORKING DEVELOPER

This consists of 25 cc of solution A, 10 cc of Solution B, 5 cc of glacial acetic acid and water to 250 cc.

The plate is then rinsed in cold water and is fixed by dipping in four per cent hypo solution. The printed surface is then sealed. To get a pronounced tone, the plate can be heated at a controlled temperature for one minute. The plates are more glossy and smooth. This technique yields brown prints of better contrast.

SEALING (Principle)

The function of sealing is one of blocking or closing of the pores in the anodic film. Sealing may be considered as an important stage which improves the corrosion resistance. The sealing process renders the coating impermeable and non-absorbent. Aluminum oxide is converted to aluminum monohydrate Al_2O_3 H_2O with a corresponding increase in volume.

Sealing can be done by exposure to boiling water or steam for nearly an hour. The porous aluminum oxide layer is not only capable of absorbing the dyes, etc., but also water which is bound inside the film as water of crystallization. During this treatment, the pores are pressed together and filled up. Because of the closing up of the pores, the sealing does not allow the incorporated materials to bleed or to take in foreign materials like dirt, stains, grease, etc.

APPLICATIONS OF THE PROCESSES

The most outstanding feature of photographic printing on anodized aluminum is its permanency, good contrast and stable nature. Corrosion-resistance and light-fastness are also good. It finds extensive use in making exact reproductions, e.g., slide rules, labels, name plates, sign boards, dials

of all kinds, curve charts, advertisement pictures, calendar cards and plans for public use such as in railways, airways, military and marine extablishments, documents for archives, portraits and landscapes, objects of art and common use with pattern and design containing fine graduation monographs.

Its advantages are:

1) The photo prints withstand the damaging effects of environment, viz., high humidity monsoon or hot water and even direct heat to some extent.
2) They are unaffected by insecticides, etc., and usual cleansing agents, disinfectants.
3) They are not affected by organic solvents like benzene, ethyl alcohol, etc.
4) They are fairly resistant to abrasion, corrosion, etc., and are lasting.

SUMMARY

Anodizing of aluminum is extensively adopted both for protection and decoration of aluminum surfaces.

In photographic processes, the light sensitive material can be introduced into the pores of anodic film of aluminum exactly as in dyeing processes. Various processes for photographic reproductions are described in detail. "Blueprint process", "Gelatin Emulsion Process", "Silver halide process", make use of sulfuric acid anodized films whereas, "Sepia tone process" makes use of chromic acid anodized films. The mechanism of film formation general characteristics of aluminum oxide, optimum conditions of anodizing, function of sealing, applications and advantages of these processes are also discussed.

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Bright plating of nickel and zinc, production of particularly hard anodic coatings on aluminum, production of calcium carbide from indigenous raw materials, production of electrolytic manganese metal from low grade Indian ores are some of the subjects of investigations he has recently been engaged in in collaboration with his colleagues.

He is an Associate of the Royal Institute of Chemistry, member of Electrochemical Society, member of Current Science Association. He was a delegate to the sixth meeting of the CITCE held in 1954 near Paris and was a delegate to the International Congress of Industrial Chemistry held at Brussels the same year. He is a member of the Electroplating Sectional Committee of the Indian Standards Institution.

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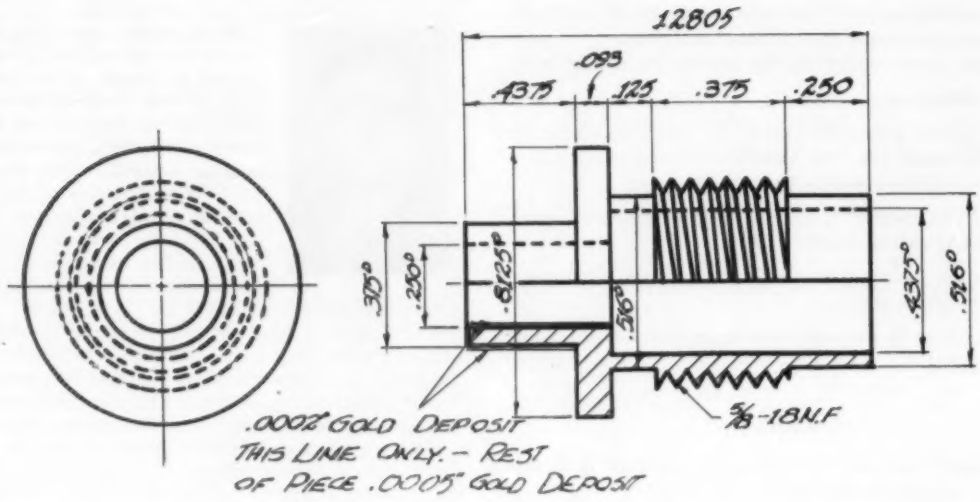

Fig. 1

CLOSE CONTROL GIVES REPRODUCIBLE VALUES IN PLATING GOLD SELECTIVELY

by OTTO F. DINGELDEIN*

ABSTRACT

The method described in this paper produces selectively plated deposits to established specifications. The five independent variables: electrolyte agitation, electrolyte temperature, solution composition, electrode geometry and current density were examined and correlated. Statistical methods were used to maintain results within narrow limits.

INTRODUCTION

OTHER AUTHORS have attacked the problems involved in plating to a specified thickness.[1] The merits of using statistical methods of control have also been examined.[2] All considerations seemed to point to the desirability of constant operating controls for the five variables to help eliminate operator error.[3] The project was undertaken to plate screw machine parts as shown in Fig. 1, to the specification marked thereon. The acceptance of the parts, grouped in definite lots, was based on the AQL method augmented by special requirements limiting the entire lot to be within a very narrow average plating thickness range. At that time no plating

* St. Louis Silversmiths, Inc., Cape Girardeau, Missouri.

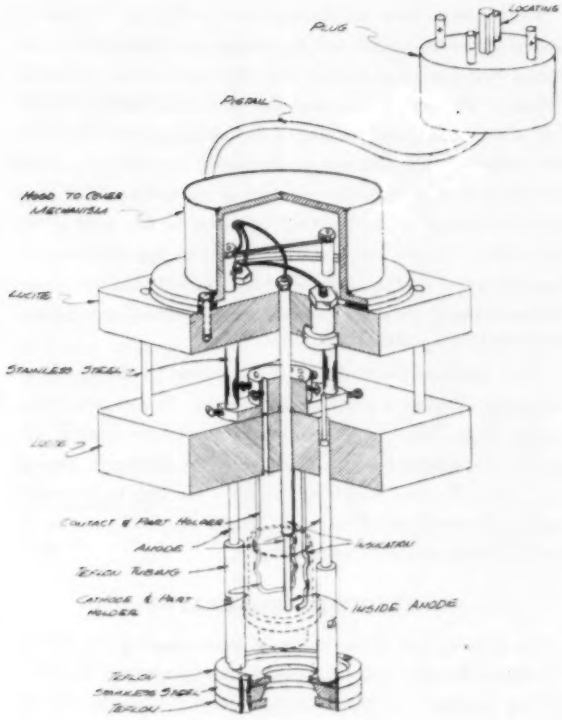

Fig. 2. Jig in loading position—open.

cycle would continually produce the thickness in the same range and slightly more than double the 0.0002 in. thickness requirement was plated to secure acceptance of the lot.

EXPERIMENTS

The actual work was started by using plating racks and plating the pieces in two steps: plating to the lowest thickness requirements on the outside 0.00005 in. and then reracking for additional plating of the areas requiring higher thickness by using auxiliary anodes, and by shielding. Microsectioning of the parts plated this way indicated that the plating was not concentric and that there was excessive buildup of gold in the high current density areas.

What was more important, variations of the thickness of deposits up to 80 per cent were noticed from piece to piece. This held true for pieces plated on the same location of the rack but in subsequent cycles. At this time the reliability of the microsectioning methods was questioned and comparison was made of the plating results by checking weighted samples on the balance.

Using both methods concurrently a definite pattern was established for all testing procedures which eliminated many of the pitfalls encountered by specimen preparation, metallographic mounting, polishing, and measuring the plating thickness.

Progressively other changes for producing plated parts were instituted. *First Step:* The agitation was changed by using a manifold to comply with the spacing of the parts on the racks. Thus, finer grain structure was gained but distrbution was not improved.

Second Step: A change to individual racks holding only one piece. Particular care was taken that all workholders were alike in dimensions and fabrication and that the agitation was uniform throughout the tank. We found it impossible to reproduce the same results on the same rack and in the same position in a subsequent plating cycle.

Third Step: The introduction of individual plating circuits for each piece. Our weights showed a leveling off of thickness fluctuations in our deposits, however, microsections did not show the same results. From one workholder to another there were thickness variations of the plating as large as 40 per cent. The conclusion was that the current distribution to each piece must be influenced by stray currents and agitation. Another variable would result from the construction of the plating jig if contacts were not identical.

The *Fourth Step* was to prove this theory by introducing only one part into the electrolyte during one cycle and limit the time of deposition to definite controllable intervals. This was done by using a specially constructed timer with an accuracy of one second and by pumping the electrolyte straight into the piece. A specially shielded jig was built carrying two independently controlled anodes and the cathode so that it was possible to plate without reracking. This method resulted in deposits which were within 3 per cent of the ideal results for current distribution when checked by our weight and microsectioning tests.

THE PROCESS

At this stage we had experimentally established the proper current distribution for (1) producing deposits within narrow limits and (2) producing heavier ones in localized areas all in one plating cycle. The task of securing the equipment was the next problem. No standard piece of equipment was available for either the tank or the current supply. The most important item for successful plating was considered to be the jig. Its requirements were as follows:

1. Capable of quantity production to close tolerance.
2. Corrosion resistant.
3. Rugged enough to stand repeated loading and unloading without deformation.
4. Easy maintenance.
5. Must carry both the anode and the cathode.
6. Designed to equalize the effect on low and high current density areas.

Following the jig design (Fig. 2), it was necessary to determine the most economical operating conditions from the standpoint of metal cost, maintenance and labor. Furthermore, instrumentation and control devices had to be as simple as possible in order to utilize the available labor force. Following these requirements the design for the entire system was worked out (see Fig. 3). It called first for a manifold which would take the solution from a sump tank where it had been heated by a water-jacket. This was to insure even and sustained temperature of the electrolyte. A series of valves were inserted to control the flow of the solution. The manifold rested in a stainless steel tank and emptied into

individual cells entering from the bottom to assure even constant pressure throughout the entire system.

The overflow came through holes in the wall of the cell which gave an added check on the performance of the manifold and pump. The plating jig was inserted into the cell and timers were activated, controlling the carefully calibrated and independently operating individual plating circuits. The entire instrumentation package was placed away from the tank to protect it from corrosion. The panel-board was designed so that each individual unit controlling one cell could be serviced individually without interrupting the functioning of the others.

OPERATION

A 30 dwt solution was used at 140° and having one ounce of free cyanide and a small amount of proprietary addition agent. During the first few weeks of operation very careful check and tally were made—the number of parts processed, the hours worked, and the current consumption were plotted versus the calculated additions. Additions were made on the basis of frequent chemical analysis of the electrolyte and carefully prepared weighted specimens. A chart for additions to the plating solution was worked out and a large batch containing all materials needed for additions was made up and metered into the sump tank according to the addition chart in small definite quantities. Analytical testing was less frequent after some experience was gained, but the weighing tests were continued at frequent intervals to insure proper current efficiency.

RESULTS

Results were very satisfactory and gratifying. Examination of pieces by weight and by microscopic measurement revealed that our total deposit was 131 mg and the minimum 129 mg. The microsectioning was performed parallel to the wall of the tubing and parallel to the opening of the drill hole. The latter was carried out progressively further away from the opening to detect any changes or variation which may not have shown in the first tests (parallel to the wall of the drill hole.) There was little variation in the thickness of deposits even in the normally high current density areas. The covering of the deep recesses was excellent and the deposits were concentric throughout.

These findings resulted in a plating close to the specifications thus effecting a great saving in gold. It was possible to employ semi-skilled labor forces and our rejects dropped appreciably. There were no rejects due to improper plating thickness. Rejects which did occur were due to incorrect timing, incorrect handling, etc. There was little downtime and all shutdowns were prescheduled.

NOTEWORTHY OBSERVATIONS

The working out of the methods substantiating the theory "to obtain definite reproduceable values for current distribution by holding the five principal plating variables rigidly

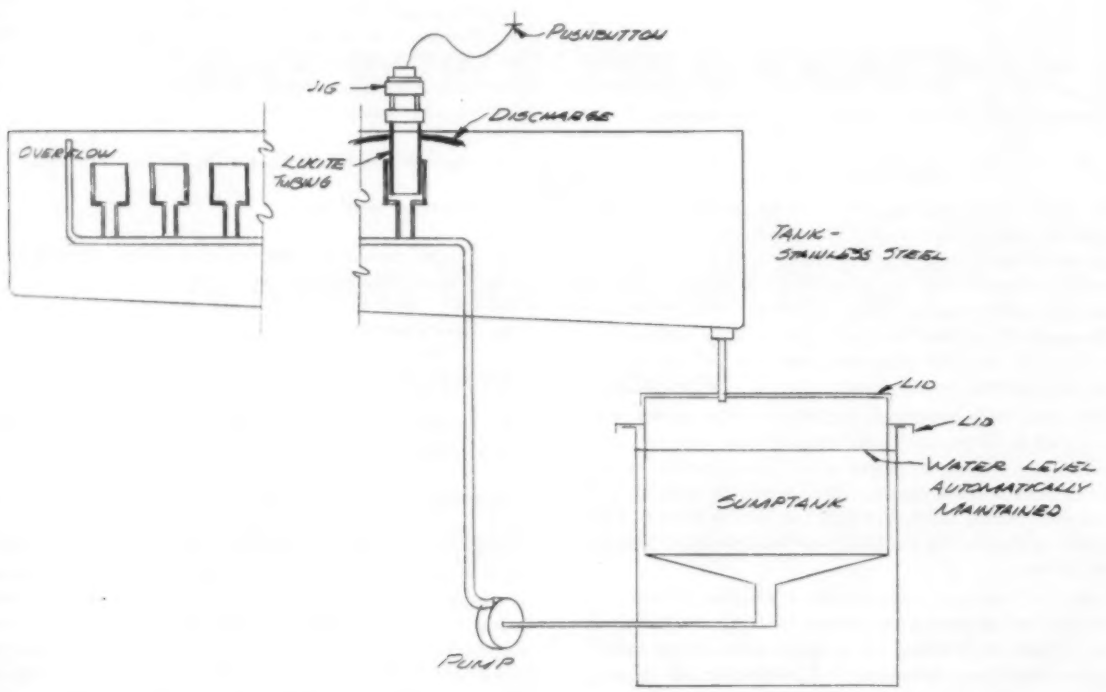

Fig. 2. Plating Equipment.

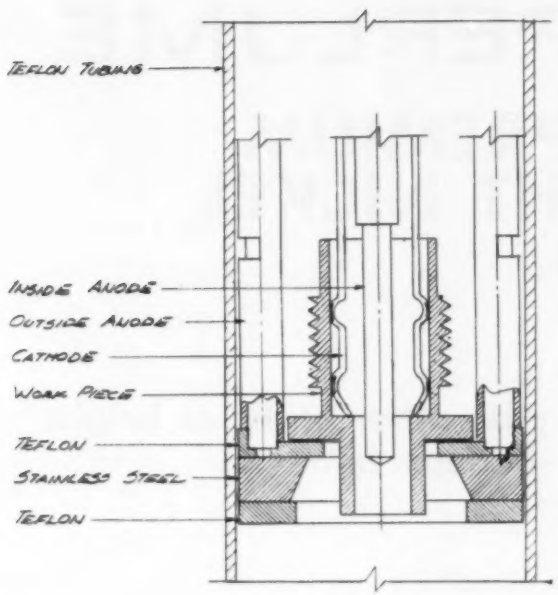

Fig. 4. Detail of anode/cathode position for critical areas.

fixed with a co-related pattern" yielded some interesting observations.

1. The variations in the temperature of the plating solution by 4° changed the plating efficiency.

2. The variation of 5 per cent in the free cyanide changed plating efficiency

3. Too small a volume of plating solution made the performance of the plating solution unstable relating to temperature and chemical composition.

4. The rate of agitation affected temperature, grain structure, and current distribution.

5. The agitation and the electrode geometry had definite co-relations. The rate of agitation, the location and size of anodes, and their independent current supply with different current densities, and the concentration of solution make-up, influenced our results. Different circumstances seemed to have prevailed for the plating of the outside and the inside, because the current density requirements varied considerably to obtain our results. See Fig. 4.

CONCLUSION

This method and process is feasible where great accuracy is needed and the volume of production will pay for the extensive experimentation and tooling. Since there is no such equipment commercially available it is necessary to have tooling facilities to produce it. Fully automatic operation can be adopted.

ACKNOWLEDGEMENTS

The success of this method was only possible by the determined research work of the metallographer making the countless microsection tests required to substantiate the theories evaluated one by one.

Dr. Otto C. Klein, director of research for the American Zinc Company and W. A. Schumaker, now superintendent of Midwest Metal Products Company, Niles, Michigan deserve much credit for evaluating the theories; Dr. E. A. Parker of Technic, Inc., Providence, Rhode Island for the solution make up and suggestions on the disposal of the abundance of rinsewaters.

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[2]Electroplating Engineering Handbook, edited by A. Kenneth Graham, Chapters 2, 6, 20. Reinhold Publishing Corporation, New York, 1955.

[3]Steinmetz, R. W., "Statistical Quality Control Applied to Plating Processes," Technical Proceedings, American Electroplaters' Soc. **47,** 45–50, (1960).

[4]Cuthberison, J. W. and J. E. Parton, "Possibilities of Automatic Control in the Electroplating Industry," Transactions of the Institute of Metal Finishing, **34,** 461–82, (1957).

Otto F. Dingeldein comes from a family on both father's and mother's sides engaged for several generations in the manufacture of gold and silver articles. He received his training at the oldest trade school for the precious metal industry in Hanau a/Main, Germany. Since 1942 he has engaged in specification plating. He is a member of the American Society for Metals, The American Electroplaters' Society and the Institute of Metal Finishing.

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SEMI-ANNUAL MEETING

ASTM, COMMITTEE B-8

HOTEL BEN FRANKLIN, PHILADELPHIA, PA.
OCTOBER 20-21, 1960

by Edward B. Saubestre
Enthone, Inc., New Haven, Conn.

Committee B-8
C. H. SAMPLE, Chairman

There appears to be a growing interest within Committee B-8 for the arranging of Symposia to be held periodically, covering various aspects of Committee activities. While consensus holds that this might be desirable, no definite action was taken at this meeting. It was brought out that the Government is currently urging federal and military agencies to make increasing use of industrial and other private agency specifications wherever practicable, where such exist. To encourage future closer liaison between government and ASTM, it was voted to hold the Fall 1961 meeting in Washington. In order to better follow up on member activities, it was voted to provide for a Membership Secretary in B-8. Letter ballot on appropriate By-law change will follow. Regarding voting in ASTM, it was again emphasized that any negative votes *must* be explained to be accepted. The question of specifications being prepared by NAMF was again brought up. Consensus is that the needs of the industry would be better served by having only one set of generally recognized specifications. It was agreed to invite NAMF representation to future meetings.

♦

Sub-committee I—Specifications
F. OGBURN, Chairman

Section A (H. Kafarski, Chairman) is looking into the possibility of adding the CASS and Corrodkote tests to present ASTM specifications which refer to the salt fog test. Section B (W. H. Safranek, Chairman) has completed all action on 223 definitions, which have been approved in Sub I. Section H (W. Geissman, Chairman) is readying a report for the next meeting dealing with a revision of A219 on thickness requirements of plated coatings. A task group headed by D. Bigge is studying methods of designating coatings, and is summarizing many industrial and government specifications. A task group headed by A. DuRose recommended no ASTM action on a Spec. covering lead for engineering and related applications, because of limited interest.

♦

Sub-committee II—Performance Tests
W. L. PINNER, Chairman

Sections A and F have been consolidated (B. Knapp, Chairman), including corrosion tests of Cu-Ni-Cr on steel, aluminum, and zinc die castings. The Program 4 panels are now in their fourth year. A report on results to date will appear in the 1960 Annual Report. After four years, these panels (Cu-Ni-Cr on steel) show zero rating at Kure Beach, N.C., except for a few buffed bright nickel panels. In the latter case, ratings are as high as 5 or 6 for 0.03–0.06 mil Cr coatings. At Detroit there was a major deterioration between the third and fourth year. Most panels are now rated 4–6, some as low as 1–2. Here again, heavy Cr is beneficial (0.03–0.06 mils), though crazing increases with Cr thickness. Unlike Kure Beach samples, buffing of bright nickel was not beneficial in Detroit. Accelerated corrosion tests will be run shortly, and will conclude Program 4. Program 5 involves duplex nickel on steel, with the primary variable being the type (conventional, crack-free, duplex) and thickness (15–120 millionths) of chromium. There will be one lot of buffed Watts nickel and one of 2 millionths of crack-free Cr. Mill finish polished steel will be used. Exposure at Kure Beach and Newark. CASS and Corrodkote correlations will also be run. Program 6 involves Cu-Ni-Cr on aluminum. Chromium is 10 millionths (conventional), Cu + Ni is 1–3 mils, Cu is 0.1–2 mils, Ni is 0.9-3 mils. Nickel is duplex in all cases. Aluminum is first zincated. Most lots are on 3003 Al. Some are on 2024, 6061 and die cast alloy aluminum. Program 7 is on zinc die casts. Cu + Ni is 1.5–3.0 mils; Cu is 0.1–1.5 mils; Ni is 0.6–2.7 mils; Cr is 15 millionths in most runs, with a few in the range 7.5–60 millionths. Nickel is duplex nickel, except for one lot of straight bright nickel. In most of the above tests, the duplex nickel will be about 20–25 per cent bright nickel, except for higher percentages on zinc die casts.

Section C (R. E. Harr, Chairman) on Chromate on Cadmium reports all panels completely rusted in New York, for all types of treatments. At Kure Beach, corrosion is slight on all panels, with copper worst, brass next worst, and slight rust on stainless steel. At Rock Island, Illinois, the stainless steel is not rusted, and the brass and copper are equally, and slightly attacked. Section D on methods of rating corrosion test specimens has been active, but report is held up because of strong differences of opinion. Section E on solderability of tin coatings (F. A. Lowenheim, Chairman) has found that tin plated specimens stored in warehouses or humidity test cabinets for up to a year showed either no change in solderability, or even improved solderability! This strongly suggests that problems encountered in industry of soldering difficulties after storage may be due more to poor plating practice than anything else. To resolve this situation, an additional program will be run on steel, copper, brass, using 0.05–0.3 mils of tin from stannate, Fluoborate, and halide baths.

♦

Sub-committee III—Conformance Tests
A. SQUITERO, Chairman

Section A, on thickness testing (DuRose, Chairman) has completed its work, and a complete report on thickness tests will be published by ASTM. Section B on Porosity (A. Mendizza, Chairman) is running accelerated corrosion tests on Cu-Ni-Cr coatings on steel. Standard panels were prepared by F. Romanoff of Apollo Metal and did *not* fail in the Corrodkote Test, using one cycle, unless the thickness of nickel was less than 0.75 mils. Below this point, failure occurred in the Corrodkote test, but results obtained were erratic. Possibly, this is due to differences in surface finish. It was found that the Corrodkote test itself can give erratic results if the ferric chloride solution is aged more than one week. At present, Sub III of ASTM Committee B-3 is standardizing the Corrodkote test. Section C on Hardness (N. Beckwith, Chairman) has completed the preliminary phase of its work. This group studied 1 and 3 mil coatings from Watts nickel, bright nickel, and acid copper. Most interesting result found after a round-robin test in 16 companies was that hardness measurements should be made on the cross-section rather than the vertical direction to the plane of the deposit. Indentation hardness testers were more satisfactory than Scratch Hardness testers. Hardness is a function of the load applied for thin coatings. Thus, for a given thickness of coating, a specific load is optional. Section E on Adhesion (R. Shaw, Chairman) reported that a bibliography on adhesion tests has been completed and will shortly be circulated to the members. This section has decided to start its work by considering Government Specs. first. Section G on Ductility (G. Tilburg, Chairman) will poll the members relative to whether they have any instruments available for ductility testing. Response to the poll will determine the degree of the Section's activity.

♦

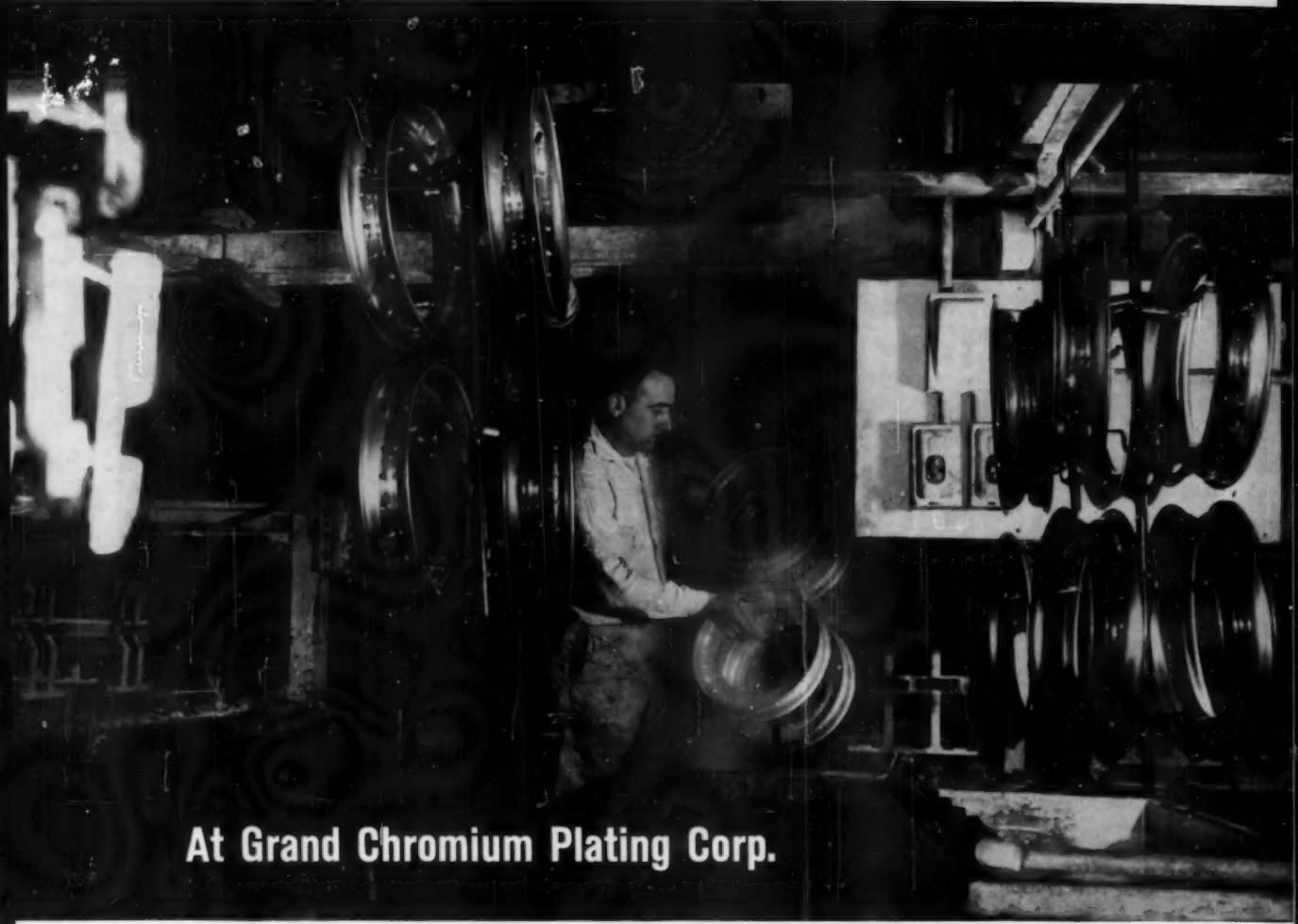
Sub-committee IV—Electroplating Practice
E. B. SAUBESTRE, Chairman

The report of Section N has now been published as ASTM Recommended Practice B-343—Plating Nickel on Nickel. Reprints are available. Section W on Industrial Water for Electroplating (H. Kafarski, Chairman) has written a report which has been circulated to interested parties. Comments received are being incorporated. Section C, Chromium plating on Chromium (B. Cohen, Chairman) has completed its work, and a revision of B-177, relating to hydrogen embrittlement, will be letter balloted. The rest of the meeting of Sub-IV was taken up with consideration of new activities. Sections are being set up on the following:

1. Auxiliary Anodes for Improving Uniformity of Electroplated Thickness.
2. Electroforming.
3. Plating on Difficult-to-Plate Metals.

Preliminary surveys will also be made on the feasibility of setting up work in the following fields: (1) Plating of Sintered Metal Powder Compacts; (2) Plating on Magnesium; (3) Plating on Non-metals.

(Continued on page 1407)



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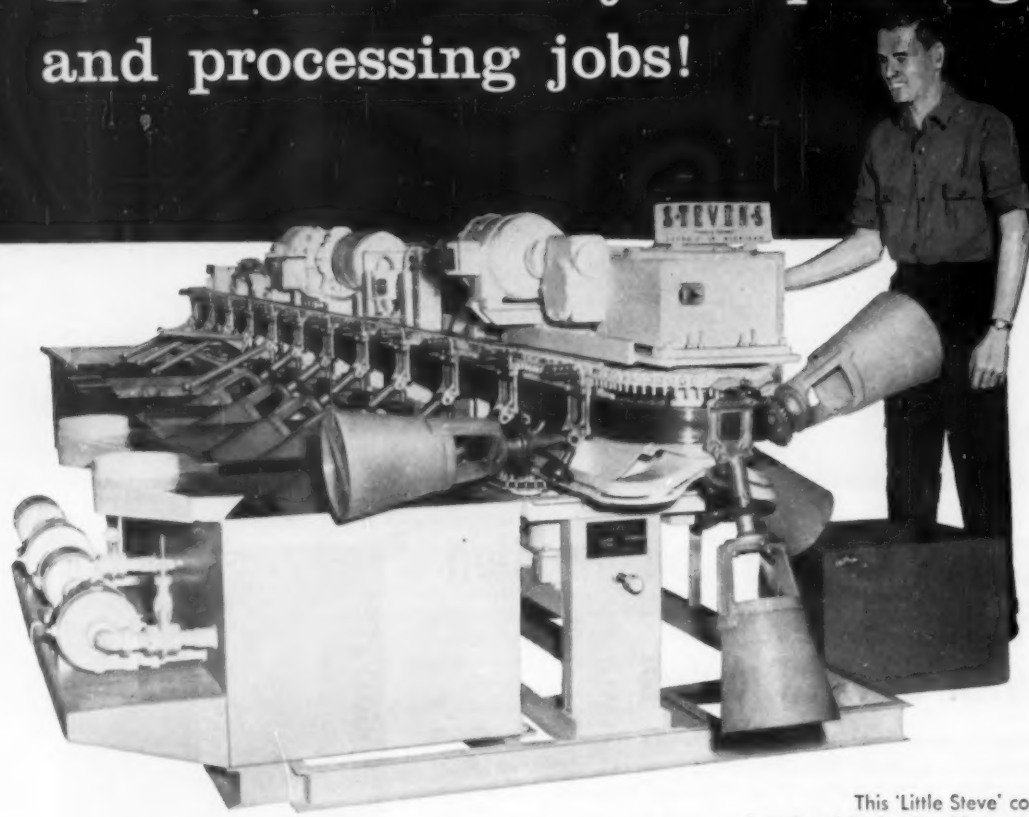

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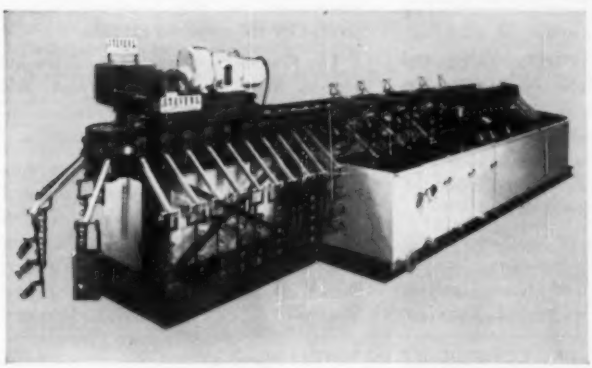

'Little Steve' with conventional stationary hump cam action offers amazing capacity in relation to its size . . . up to 400 racks per hour on normal plating production. This 'Little Steve' will efficiently handle a wide variety of racks or, if desired, a single part can be placed on each carrier arm.

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ABUNDANT EDUCATIONAL FARE IN AES MEETINGS AHEAD

Education in electroplating, metal finishing and allied arts will have large exposure at coming annual meetings of AES Regions and Branches in the immediate period ahead.

Two outstanding meetings are fare for December, namely the two-day Detroit Branch Annual Educational Session and Christmas Party to be held December 2–3, 1960 at the Statler-Hilton Hotel in Detroit, and the two day Newark Branch Annual Educational Session and Christmas Party to be staged at the Robert Treat Hotel, Newark, N. J. December 16–17, 1960.

Speakers in Detroit will include Vincent Cassidy of Ford Motors Company; G. Levy, Chrysler Corporation and Harold Kahler, General Motors. At Newark, the Branch will hear Arnold Kraft, Sel-Rex Corp. and Richard Bikales, Metal & Thermit Corp.

January will feature not only the Grand Rapids Branch Symposium on Quality Control at the Pantlind Hotel, Grand Rapids on January 21 to be followed by a banquet, but also the Cleveland Branch Educational Meeting and Banquet, January 27–28. The Educational Session will be held at the Technical Center, Cleveland Engineering Society on Friday; the Saturday banquet at the Carter Hotel.

January educational attention will also be focussed upon the traditional Chicago Branch Annual Meeting to occur at the Conrad Hilton Hotel, January 28. A gala banquet will follow a reportedly outstanding Educational Session.

Ahead in February will be five noteworthy AES Educational events, namely, The New York Branch Annual Educational Session and Banquet (Statler Hotel, February 4); The Third Annual Dixie Regional Technical Session (Hotel Roanoke, Virginia, February 3–4); The Saginaw Valley Branch Annual Educational Session and Banquet (Frankenmuth, Michigan, February 4); The Seventh Annual Tri-State Regional Meeting (Deshler-Hilton Hotel, Columbus, Ohio, February 4) and the San Francisco Branch Educational Sessions and Annual Dance (Jack Tar Hotel, February 18).

EXHIBITS, SPEAKERS, WORKSHOPS FEATURE SUCCESFUL MIDWEST REGIONAL CONFERENCE

The second Midwest Regional Council Conference was held at Notre Dame University on Saturday, October 29.

Many fine exhibits, illustrating problems in metal finishing, were on display in the lobby of the Engineering Building.

At the morning session E. A. Hardy of the Traveler's Insurance Co. spoke on the subject of "Plating Room Safety" and Robert Geisel of the Adolph Plating Co. discussed "Metal Finishing Personnel."

Mr. Hardy discussed general problems concerning the uses of hazardous materials and laid down methods for analyzing unsafe practices and situations.

Mr. Geisel discussed the minimum intelligence levels required for metal finishing personnel, and described methods of testing shop applicants. He also emphasized the importance of correlating the intelligence and ability of the operator with the requirements of the job.

After lunch at the Morris Inn, George Trexler of Notre Dame University spoke on the subject of "Germ Free Life."

AES National President W. Andrew Wesley introduced the members of the Executive Board and spoke briefly on current activities and the status of the Society.

The afternoon was devoted to three workshop sessions held concurrently.

The Mechanical Finishing workshop was moderated by First Vice President Chester G. Borlet with Messrs. Chet Kennedy, Harry Walker, Les Morgan and L. R. Davison as panel.

The Plating workshop was moderated by Second Vice President Manuel Ben and the panel members were Don Morris, Jack Winters, John Hunt and Dr. Harold J. Wiesner.

The Organic Finishing workshop had as moderator, Past President Ralph D. Wysong and the members were Peter Iwema, Barney Case, Joe Andrus and John Holland.

The three workshops based their panel discussions on the problems demonstrated by the prepared exhibits.

The Conference attracted members and visitors from the entire Midwest, and achieved its purpose of presenting an unusual, interesting and valuable program.

Arrangements for the Conference were made by Gene Roth acting as general chairman with the assistance of Dr. Wilhelm, Ralph Brower, John Bayman, Louis Rague, Sam Alfano, Henry Meers, R. D. Wysong, Si Gary and Frank Marshall.

LESLIE L. DIVELEY

MIDWEST COUNCIL PLANS 1961 CONFERENCE

The Midwest Regional Council had its meeting at Notre Dame University on October 29. The Council discussed plans for its Third Annual Conference which will be held in the Chicago area in late October of 1961.

Clyde Kelly and Dr. J. H. Monaweck were appointed co-chairmen, and Scott Modjeska as educational chairman for that Conference. The site and other details of the Conference will be discussed at the next Council meeting.

The Nominating Committee consisting of Harold Ellis, chairman, of Rockford, George Parisho of Mississippi Valley, and Robert Steuernagel of Milwaukee was appointed.

Eugene Roth, general chairman of the Second Conference which was held that day at Notre Dame, gave a final report on the very successful operation.

The next meeting of the Council will be held at 9:00 a.m., Saturday, January 28, 1961 at the Conrad Hilton Hotel in Chicago.

LESLIE L. DIVELEY

SECOND ANNUAL MIDWEST REGIONAL CONFERENCE IN SOUTH BEND

(1) Chester G. Borlet, standing, left, moderator, and panel members of the Mechanical Finishing workshop. (2) Ralph D. Wysong, standing, moderator, and panel members of the Organic Finishing workshop. (3) Manuel Ben, standing, moderator, and panel members of the Plating workshop. (4) Midwest Council meets to plan for 1961 regional conference.

Photos Courtesy of Products Finishing Magazine

AES NEWS

SIX NOMINEES VYING FOR 1960-1961 HIGEST AES SCIENTIFIC HONOR

By October 15, 1960 deadline, six chartered AES Branches nominated six distinguished AES members for consideration for the 1960-1961 AES Scientific Achievement Award, the Society's summit scientific honor.

Each nominee being an eminent scientist with a decade-plus period of AES membership and outstanding scientific service, the six were respectively nominated by the Baltimore-Washington, Grand Rapids, Indianapolis, New Haven, Newark and Philadelphia Branches of the Society. One Branch nominated a first and second choice. Two Branches nominated the same prominent scientist.

The nominating forms and dossiers of each nominee have now been channeled to the AES Scientific Achievement Award Committee. That Committee's selection will be made by April 1, and will be announced at the Grand Opening Session of the AES's 48th Annual Convention, Statler-Hilton Hotel, Boston, Massachusetts, June 19, 1961. He will deliver the annual "William Blum Lecture" at the AES's Milwaukee Convention in June 1962, and will receive a $500 honorarium, a handsome laminated scroll and attendant honors.

EXECUTIVE BOARD VANQUISHES HEAVY AGENDA AT SPECIAL SOUTH BEND MEETING

Convened in special session at the LaSalle Hotel, South Bend, Indiana, Friday, October 28, 1960, the AES's Executive Board, among a host of other enactments, not only approved the audit statement of the Society's 47th Annual Convention that was held in Los Angeles, California, July 24–28, 1960, with its Los Angeles Branch as host, but also adopted the preliminary budget of the AES's 48th Annual Convention that will be conducted at the Statler-Hilton Hotel, Boston, Massachusetts, June 18–23, 1961, with its Boston Branch in charge.

Channeled to it by the Los Angeles Branch Convention Committee through Walter P. Behlendorf, the Committee's Finance Chairman, the audit statement prepared and certified by Arnold Kirsch, certified public accountant of Studio City, California, revealed a net profit for the Supreme Society of $1,526.56. The Board, at its October 28 meeting, approved the certified financial statement following detailed study, and authorized acceptance of the resultant Supreme Society profit for deposit to the credit of the Society's General Fund. The certified statement indicated the Convention's registered attendance as being 739 males, 336 females and 141 children, a higher total than had preliminarily been estimated for this first Annual Convention west of St. Louis in AES's half-century lifetime. For information and benefit, copies of the certified statement are being sent to the General Chairmen of all AES's National Conventions ahead.

The Boston Convention's approved preliminary budget not only embodies a master budget pegged to a preliminarily estimated 1250 adult male and female attendance, but also a supplementary children's budget beamed to a preliminarily estimated 150 AES youngster attendance. The Board approved a $25 per male or female adult registration fee as at the Los Angeles Convention, and also approved a $15 per child registration fee (not including either a Banquet ticket or a ticket to the Boston Pops Concert). Parents wishing to do so may purchase Banquet tickets for their registered children separately at $8.50 apiece and, if available, may also purchase Boston Pops Concert tickets at $1.50 per child separately.

Among other business, the Board sanctioned the preparation of manuscripts on the subject of "Finishing of Aluminum" for possible publication in book form for AES, by contract, by a prominent technical book publishing company. It approved the Agenda of the coming Eighth Interim Meeting of the Supreme Society (Statler-Hilton Hotel, Hartford, Connecticut, February 11, 1961). It amended the prevailing schedule of "Per Capita Tax Due or Refund Allowed if Branch Membership Changes are Received from AES Chartered Branches at National Headquarters between Specified Dates of the Current Fiscal Year." Beside legislation, it also engaged in a long, detailed session focussed upon short-range and long-range planning.

National President W. Andrew Wesley presided. Also present were First Vice President Chester G. Borlet; Second Vice President Manuel Ben; Third Vice President Frank O. Beuckman; Immediate Past President Ralph D. Wysong and National Executive Secretary John P. Nichols.

SAN DIEGO, AES's POTENTIAL 60th BRANCH, TEMPORARILY CHARTERED

Culminating months of local planning and effort, aided by stalwarts of the Los Angeles Branch of American Electroplaters' Society, Inc. (AES), an AES Branch has just been created in San Diego, California, and has been voted a Temporary Charter by the Executive Board of the Society effective November 1, 1960.

The neophyte Branch must successfully operate a minimum of three months before it may apply to the AES Executive Board for a Permanent Charter as AES's SIXTIETH chartered Branch.

HOST: AES NEW ENGLAND REGIONAL

INTERIM MEETING REPORTER

STATLER-HILTON HOTEL HARTFORD, CONN. FEBRUARY 11, 1961

EIGHTH INTERIM MEETING SUPREME SOCIETY AMERICAN ELECTROPLATERS' SOCIETY, INC. STATLER-HILTON HOTEL HARTFORD, CONNECTICUT FEBRUARY 10-12, 1961

FRIDAY, FEBRUARY 10

9:00 a.m.—Executive Board Meeting *Executive Suite*

8:00 p.m.—Annual Joint Meeting, Executive Board, American Electroplaters' Society (AES) and Board of Trustees, Metal Finishing Suppliers' Association (MFSA) *(To be announced)*

SATURDAY, FEBRUARY 11

9:00 a.m.—Registration, Delegates and Alternate Delegates (AES) *Mezzanine*

10:00 a.m.—Eighth Interim Meeting, Supreme Society, AES *Hartford Room*

1:00 p.m.—Luncheon, Delegates/Alternates, AES (Dutch Treat) *Rooms 408-12-16-20*

2:00 p.m.—Eighth Interim Meeting, Supreme Society, AES *Hartford Room*

5-6:00 p.m.—Reception to Delegates/Alternates, AES

8:00 p.m.—"Old Timers' Night", New England Regional Council and Delegates/Alternates (Dutch Treat) *Saengerbund Hall, 266 Washington St., Hartford, Conn.*

SUNDAY, FEBRUARY 12

9:00 a.m.—Executive Board Meeting *Executive Suite*

EIGHTH INTERIM MEETING FEBRUARY 11, STATLER-HILTON HOTEL, HARTFORD

With the AES's New England Regional Council as host and Allen Ferguson and Richard Barrett of the AES's Bridgeport Branch serving as Co-Chairmen for Arrangements, the Eighth Interim Meeting of the Society will occur at the Statler-Hilton Hotel, Hartford, Connecticut, Saturday, February 11, 1961.

On the prior day, the Executive Board will meet in all-day executive session at the same hotel, and that evening (Friday, February 10), it will engage in its traditional joint meeting with the Board of Trustees of the Metal Finishing Suppliers' Association (MFSA). The Board will continue its own meeting Sunday, February 12, to adjournment.

Saturday's Supreme Society meeting will commence at 10 a.m. and will face the Agenda that is spread elsewhere on this page. The meeting will recess for a Dutch Treat luncheon of Delegates and Alternates at 1 p.m. and will resume an hour hence. Adjournment by 5 p.m. is expected, and Delegates and Alternates are invited to an hour's reception sponsored by National Headquarters from 5 to 6 p.m.

The day will conclude with a Dutch Treat "Old Timers' Night" sponsored by the AES's New England Regional Council itself, starting at about 8 p.m. that Saturday evening. It will be held at Saengerbund Hall, Hartford, Connecticut.

FUTURE MEETINGS

Education is the business of AES. For National, Regional and Branch educational and other AES meetings ahead, see PLATING's section titled FUTURE MEETINGS herein.

The ultra modern Statler-Hilton Hotel in Hartford, Connecticut, where the AES Supreme Society will hold its Eighth Interim Meeting.

TENTATIVE AGENDA EIGHTH INTERIM MEETING AES SUPREME SOCIETY

STATLER-HILTON HOTEL
HARTFORD, CONN.

FEBRUARY 11, 1961

1. Welcome by New England Regional Council
2. Welcome by National President
3. Opening of the Session as an Interim Meeting.

   Purpose of the meeting as a sounding board on matters for subsequent consideration and action by the Supreme Society at its Annual Meeting in Boston, June 22, 1961
4. Progress and Status Reports:

   Financial by President

   Educational by First Vice President

   Membership by Second Vice President

   Branch Regionalization, Regional Annual Meetings and Branch Monthly Meetings as Tools of AES Educational Mission by Third Vice President

   Honorary, Merit and Achievement Awards as Inducements for Greater AES Service by Immediate Past President,

   Headquarters and AES Publishing and Public Relations by National Executive Secretary

   AES Research Program by Chairman, Research Committee
5. Preliminary Reports:
   a) Executive Board Appraisal as to AES Financial Structure
   b) Executive Board Recommendations for AES Constitutional and/or Bylaw Amendments If Any
   c) Membership Promotion (Membership Committee Chairman)
   d) Sustaining Member Promotion (Vice Chairman for Finance, Research Committee)
6. AES National Conventions and Interim Meetings
   a) 1961 Boston Convention (Boston Convention General Chairman)
   b) Other AES National Conventions Ahead
   c) Eighth Interim Meeting, Hartford (General Chairman)
   d) Ninth Interim Meeting, Indianapolis
   e) Report of Outcome of Los Angeles Convention
   f) Progress Report on St. Louis Industrial Finishing Exposition (1964)
7. Invitations from Branches to Host 1967 National Convention or 1963 Interim Meeting
8. New Business Brought for Discussion by Delegates
9. Announcement of Candidates for Third Vice Presidency
10. Adjournment

MEMPHIS-MIDSOUTH INSTALLED AS AES's 59th CHARTERED BRANCH

At a gala installation meeting held Friday evening, October 21, at the Peabody Hotel, Memphis, Tennessee, the Memphis-Midsouth Branch of American Electroplaters' Society, Inc. (AES) was formally admitted as the Society's 59th chartered Branch by National PresidentW. Andrew Wesley, in behalf of the Executive Board.

Greeted by Governor Buford Ellington and personally welcomed to the City of Memphis by City Commissioner William Farris, one of that municipality's five Commissioners, the infant Branch's entry into AES was also extolled at the meeting by John P. Ellis, Executive Vice President of the Memphis Chamber of Commerce. Commissioner Farris, in behalf of Mayor Henry Loeb, presented Keys to the City to National President Wesley and to National Executive Secretary John P. Nichols who also composed AES's National Officer installation team. Branch President Edward L. Lorenzen presided.

After Branch Secretary-Treasurer Philip R. Dickinson, a founding father of the Memphis-Midsouth Branch, had orally presented a fitting biography of the neophyte Branch from origin to installation, the Branch was indoctrinated as to AES and the duties and responsibilities of AES chartered Branches by National Executive Secretary Nichols for whom this meeting culminated a six-Branch, ten-day speaking tour (St. Louis, Kansas City, Wichita, Houston, Dallas-Fort Worth and Memphis-Midsouth).

National President Wesley next addressed the Branch, installed it and presented to Branch President Lorenzen, its laminated Charter. President Wesley also installed its first Branch Officers and oriented its Delegates and its Alternate Delegates.

A Branch meeting followed the Installation Meeting. Among other business, the Branch heard preliminarily, the invitation of Philip R. Dickinson to sponsor personally a Memphis-Midsouth Branch Annual Achievement Award.

Branch Officers installed, besides Messrs. Lorenzen and Dickinson, were First Vice President James R. Lee; Second Vice President William Neumeister; Branch Librarian Michael Derden and Board of Managers members C. E. Herndon, Frank G. Donofrio and John H. O'Neal. Messrs. Lorenzen, Donofrio and Tiebout are the new Branch's first elected Delegates.

A telegram of welcome to the Memphis-Midsouth Branch from the AES's Dixie Regional Council was read to the meeting. The new Branch becomes that AES Region's fourth Branch, others being the AES's Southeastern, Blue Ridge and Miami Branches.

TENNESSEE
EXECUTIVE CHAMBER
NASHVILLE 3

BUFORD ELLINGTON
Governor

TO THE MEMBERS OF
THE AMERICAN ELECTROPLATERS' SOCIETY MEMPHIS-MIDSOUTH BRANCH

I have been informed of the installation of the Memphis-Midsouth Branch of the American Electroplaters' Society, and I wish to extend to the members of this new branch my congratulations.

I believe this new organization will serve a very definite and useful purpose in Tennessee and that it will derive even greater vigor from our state's industrial development.

It gives me a great deal of pleasure to welcome this new organization to Tennessee and I wish you every success.

Sincerely,
/S/ *Buford Ellington*
BUFORD ELLINGTON

BE/bk

(1) Left to right, Branch Secretary Philip R. Dickinson, National President W. A. Wesley, National Executive Secretary John P. Nichols, City Commissioner William Farris, Branch President Edward L. Lorenzen and Memphis Chamber of Commerce Executive Vice President John P. Ellis. (2) National President W. Andrew Wesley presents Memphis-Midsouth Branch charter to Branch President Edward L. Lorenzen. (3) Wesley Installs First Memphis-Midsouth Branch Officers. Left to right, National President W. A. Wesley, Branch President E. L. Lorenzen, First Vice President James R. Lee, Secretary-Treasurer Philip R. Dickinson, Branch Librarian Michael Derden, Board of Managers: C. E. Herndon, Frank G. Donofrio and John H. O'Neal. (4) Branch Secretary-Treasurer Philip R. Dickinson presents history of creation of new Memphis-Midsouth Branch at its installation as AES's 59th chartered Branch, Peabody Hotel, Memphis, Tennessee, October 21, 1960.

CITY OF BOSTON
OFFICE OF THE MAYOR
CITY HALL

JOHN F. COLLINS
Mayor

October 6, 1960

American Electroplaters' Society, Inc.
American Building, 443–445 Broad Street
Newark 2, N. J.

Gentlemen:

As Mayor of Boston, I am happy to welcome the Forty-Eighth Annual Convention of the American Electroplaters' Society, Inc., and extend to you the greetings of its citizens. To the many delegates, members and guests of the Society, we offer our friendly, courteous and enthusiastic hospitality—our heritage for over three hundred and twenty-five years.

This assembly of your organization, June 18–23, 1961, and all the business, social, recreational and cultural functions attendant thereto, will, I am sure, be a most delightful and productive one.

Boston's history is the history of America. Its claim to historical greatness is not all that will interest you. Boston is a modern, progressive city where the arts and sciences flourish, and where culture and business pursuits are gracefully blended. Although venerable in years, and justly proud of her history, Boston offers you every advance in modern living, comfort, recreational facilities and entertainment.

May your deliberations in convention be successful and beneficial—may your stay with us be enjoyable—may you carry home fond recollections of Boston—and may you come again to see us soon!

Respectfully,

John F. Collins

Mayor of Boston

YOU AND I ALONG THE FREEDOM TRAIL

JUNE 18-23 1961

The Old State House is on the site of the first Town House in Boston, built 1657. Present building was built in 1713, burned in 1747, and rebuilt retaining the former walls.

WHEREAS, the City of Boston, founded in 1630, is one of the oldest Metropolitan Areas in the United States, and

WHEREAS, many of the most significant events connected with the early history of our country took place in Boston, and

WHEREAS, Boston is the locale of many of the shrines intimately connected with the Revolution and the birth of freedom in these United States, and

WHEREAS, no true American's education is complete without a pilgrimage to these shrines along the FREEDOM TRAIL

NOW THEREFORE DO I, John F. Collins, Mayor of Boston, declare that the FREEDOM TRAIL is hereby opened to the peoples of the world; and that a universal invitation and welcome is extended everyone to visit the City of Boston and to travel the FREEDOM TRAIL.

♦

"Old North Church" is a favorite stopping place along Boston's famous Freedom Trail which takes visitors to Boston on a systematic walking tour of the city's many historic shrines.

MEMBERS of American Electroplaters' Society, Inc. (AES), their families and their guests will travel the FREEDOM TRAIL, June 18–23, 1961, when they converge upon historic Boston's modern Statler Hotel to be educationally enriched in the arts and sciences of electroplating, metal finishing, organic coating and allied arts at AES's 48th Annual Convention, and to fill in "off duty" hours there with fellowship, fun and unique sightseeing. AES's Boston Branch, itself observing its Fortieth Anniversary, is Host Branch.

For a $25 per adult (male or female) registration fee, there will be a nine-session Educational Program—a noteworthy Opening Session—fine Ladies Programs—a trip to the Boston Pops Concert—a Clambake—cocktail parties—gala evenings—a Banquet, entertainment and dance—plant visits—the works, Boston Branch style.

On your own, there will also be memorable sightseeing along the FREEDOM TRAIL. Traversing quaintly crooked streets that once were cowpaths, you will see Faneuil Hall, the State House, the site of the Boston Massacre, King's Chapel, Paul Revere's house, Old North Church, Bunker Hill Monument, the Athenaeum, and the graves of John Hancock, Samuel Adams and Paul Revere among many other sights to behold and to cherish their memory forever.

You are planning to attend AES's 48th Annual Convention and make it a family holiday along the FREEDOM TRAIL, aren't You? We'll have the pleasure of seeing YOU there, YES?

INTERSOCIETY NEWS

WESTERN METALS CONGRESS PLANS VARIED PROGRAM

Research, processing, cost reduction, testing, heat treating and advanced design will be underscored in the 12th Western Metal Congress, to be held March 20–24 in Ambassador Hotel, Los Angeles, at the same time as the Western Metal Exposition in Pan-Pacific Auditorium. The events are sponsored by American Society for Metals.

In addition to ASM idea-sessions of the 12th Western Metal Congress, Society for Nondestructive Testing will participate with a full technical program. About 50 papers will be featured by the two societies.

Meanwhile, a broad panorama of western industry is rapidly taking shape for ASM's 12th Western Metal Exposition. At this early date, products of 214 metalworking firms in 153 exhibits are scheduled to be displayed in Pan-Pacific Auditorium and Pavilion.

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LINFORD RECEIVES ELECTROCHEMICAL SOCIETY AWARD

The 1960 Edward Goodrich Acheson Gold Medal was awarded to Dr. Henry B. Linford, Professor of Chemical Engineering at Columbia University, on October 11 by The Electrochemical Society at its 118th meeting. The presentation was made by Dr. Ralph A. Schaefer, president, in recognition of Dr. Linford's distinguished service to the Society and for his contributions to education in electrochemistry.

In his address of acceptance Dr. Linford pointed out that our educational system must encourage the development of talents latent in our students if our educational institutions, on a national scale, are to provide the engineering and science leaders of the future.

He stressed that teaching standards in our secondary schools are woefully lacking. Dr. Linford reported that New York State has recently made a move in the right direction by raising the number of credits required in subjects to be taught by providing that new teachers must increase the number of semester hours in science from 21 to 42 and in mathematics from 9 to 18. He stressed that these courses should be taken in recognized liberal arts colleges.

He pointed out that a rebirth of our secondary schools was necessary in order to provide the proper fundamental basis for more advanced education in the sciences. Courses, both at the secondary and college levels, should be geared to the bright students, otherwise mediocrity will prevail. He reported that many bright students are able to absorb more advanced learning but are presently being deprived of the opportunity to do so.

Dr. Linford recalled his personal experience at Columbia University when he worked with 24 special high school students during a six-weeks course in Thermodynamics at his University's summer camp in 1959. Some had previously studied chemistry and physics and some had not. At the conclusion of the course an examination, equivalent to one given to his junior chemical engineering students at the University, was taken and all these students made a very creditable showing, which proved that they were capable of absorbing more advanced learning at the high school level. Dr. Linford stressed the point that we should not encourage students to enter college at a younger age, but that we should prepare the bright students with more advanced training at the secondary level.

Dr. Linford, who presently is senior vice president of the Society, is the unopposed candidate as its next president to take office in the spring of 1961.

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REYNOLDS 1961 HEAD OF PLASTICS ENGINEERS

Frank W. Reynolds, manager of IBM's Plastics Laboratory at Endicott, N. Y., has been elected the 1961 president of the Society of Plastics Engineers. Other 1961 officers elected by Council, SPE's governing body, at a recent meeting in the Hotel Commodore in New York include: Vice president, engineering, James R. Lampman, manager, Organic Chemical Engineering Materials and Process Laboratory, General Electric Company, Syracuse; vice president, administration, John Delmonte, president, Furane Plastics Company, Los Angeles; secretary, Maurice F. Malone, sales development supervisor, Canadian Resins & Chemicals Co., Shawinigan, Quebec, Canada; treasurer, John Berutich, sales engineer, Haveg Industries, Louisville.

All will take office on January 25, 1961, at the Society's annual technical conference in Washington, D. C.

Mr. Reynolds has long been associated with both the plastics industry and IBM. He was instrumental in organizing the IBM plastics laboratory in 1940 and has served as its manager since 1951. He has also been active in educational activities as lecturer in plastics for both Cornell University and IBM.

Mr. Lampman served as secretary of the Society in 1960 and membership chairman in 1959. A charter member and first president of the Central New York Section, he has been on the G. E. staff since 1948.

Mr. Delmonte, founder of Furane Plastics, has also been associated with plastics for 20 years.

Mr. Malone has been a staff member of Canadian Resins & Chemicals since 1952 in both laboratory and sales positions. Mr. Berutich joined Haveg in 1959.

Novel program innovations including a special panel of four guest lecturers and technical sessions on newest aspects of the plastics industry will be featured at the SPE 17th annual technical conference. Preliminary program of the conference to be held at the Shoreham Hotel in Washington, D. C., January 24–27, 1961, incorporates more than 125 technical papers comprising over 30 separate sessions.

Guest lecturers, prominent in the quality control field, will present a series of special papers at a session on "Statistical Quality Control and Design of Experiments."

General Chairman of the 17th ANTEC is Gordon M. Kline of the National Bureau of Standards. Vice chairman, program, is Albert Lightbody and speakers committee chairman is Henry A. Perry, both of the Naval Ordnance Laboratory. Frank W. Reinhart of the National Bureau of Standards is vice chairman, arrangements.

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ASTME INAUGURATES MANUSCRIPT AWARD

Inauguration of an "Outstanding Manuscript Award" has been announced by the American Society of Tool and Manufacturing Engineers' national program committee.

The first award will be available for presentation to one of the speakers from the ASTME 1961 Engineering Conference and Exhibit in New York City, May 22 to 26, 1961.

Harry E. Conrad, executive secretary of ASTME, in announcing the award said, "Selection of the winning engineering paper will be made by a special committee appointed by the chairman of the national program committee, James R. Matthew, a mechanical engineer with Hughes Aircraft Co., Culver City, California."

Manuscripts will be judged on technical excellence (originality and degree to which they advance scientific and educational progress of tool and manufacturing engineering,) writing excellence (not literary skill,) and aptness of illustrations (where illustrations are required).

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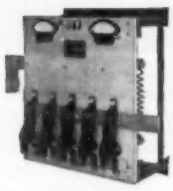

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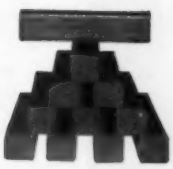

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INDUSTRY NEWS

STEVENS MOVES PLANT TO WALLINGFORD

As part of an expansion program designed to improve its ability to serve metal finishing customers in the New England area, Frederic B. Stevens, Inc. has moved its plant from New Haven to Wallingford, Connecticut.

The new Stevens installation is located at 440 South Colony Street, Wallingford, Connecticut and enables the Detroit concern to greatly expand its facilities for the manufacture of buffing compositions and the warehousing of supplies and equipment for the metal finishing trades.

Situated on Highway 5, just a stone's throw from the Wilbur Cross Parkway, the new Stevens branch is ideally located for service to the entire New England area and is within quick-delivery-time of New Haven, Waterbury, Hartford, Meriden and New Britain.

In addition to expanding its manufacturing and warehousing facilities, Stevens is also increasing its capacity for lining plating and processing tanks of all types and sizes.

A well equipped laboratory for the testing of metal finishing materials and equipment is also being established in the new building.

Walter Lynch, Stevens regional manager in New Haven, will continue in this capacity at the Wallingford branch.

BUTCHER SOLD BY UDYLITE TO WILBUR-ELLIS

The Udylite Corporation and Wilbur-Ellis Company announced jointly that the L. H. Butcher Company, a wholly owned subsidiary of Udylite will be sold to Wilbur-Ellis effective December 1, 1960. The sale is subject to ratification by the respective parties' Boards of Directors.

The L. H. Butcher Company started business in 1890 as a wholesaler and distributor of a complete line of industrial chemical supplies and equipment. At the present time the company, with headquarters in Los Angeles, operates in the eleven Western states. Distribution facilities are located in Los Angeles, San Francisco, Fresno, Brawley and W odland, California; Portland and Medford, Oregon; Seattle, Washington, and Salt Lake City, Utah.

Annual sales volume is approximately $18 million with an indicated net worth of approximately $3 million. Business will be continued with no change in personnel, as a division of Wilbur-Ellis Company.

ATTENDANTS AT HANSON-VAN WINKLE-MUNNING SALES EDUCATION MEETING

Members of H-VW-M sales force who attended sales education meeting, held October 17-19 at Hershey, Pennsylvania. The three-day session consisted of 24 hours of lectures and technical discussions of new processes and equipment, and the research and development program. Left to right: (Bottom Row) R. Bauer, W. J. Harper, G. K. Robins, E. E. Carlson, W. M. Teets, H. B. Koehler, M. B. Diggin, G. M. Herring and R. E. Waite. (Second Row) R. E. Creamer, A. C. Pearson, C. E. A. Solla, C. T. Peebles, C. E. Campbell and W. H. Brown. (Third Row) W. R. Lockwood, H. F. Allen, E. C. Bosl, T. E. O'Callaghan, R. M. Norton, P. C. Burnham and M. A. Tardiff. (Fourth Row) J. A. Badaluco, R. R. Granquist, T. M. Rodgers, W. A. Mercer and F. Badaluco. (Fifth Row) C. R. Smith, H. L. Grutter, J. S. Hart, A. A. Nortof, W. J. Slattery Jr. and C. A. Pickering. (Sixth Row) R. K. Martin, J. P. Muscarella Jr., W. L. Guiltinan, F. H. Dayton, J. D. Kershaw and D. H. Morris. (Back Row) R. G. Marshall, W. M. Pike and W. S. Wilkinson.

Cecil Thornton (right) and his wife, Marian, are presented with a silver coffee service by the president of MacDermid Incorporated, Harold Leever, garbed in the traditional Scot's dress.

MAC DERMID PRESENTS SILVER SERVICE TO THORNTON

Cecil Thornton, sales representative for MacDermid Incorporated in the Rochester, N. Y. territory recently announced his retirement from the company after 36 years service. At a recent gathering of the MacDermid "Clan," Harold Leever, president of the Waterbury, Connecticut manufacturer of metal cleaning, plating and finishing chemicals, presented a sterling silver coffee service engraved with the names of company officers and salesmen to Mr. and Mrs. Thornton. Fred Johnson will take over as MacDermid sales representative in the Rochester territory.

Find "gold" in your plating tank by installing M&T Bronze bath

You plate an alloy deposit consisting of about 88% copper and 12% tin with M&T Bronze. And the result is beautiful to behold. The finish rivals 24K gold in color . . . is more distinctive than brass . . . proves more economical than the usual triple plate of copper, nickel, gold.

M&T Bronze can be plated mirror bright, matte or any degree of brightness in-between. The gold color finish not only attracts the eye but repels corrosion as well. Protected with a clear lacquer, it affords the long, tarnish-free life expected from a quality finish.

M&T Bronze shines in production benefits, too. It can plate up to one-tenth mil in one minute. This is one of the fastest deposition rates of any copper or copper alloy process. With phenomenal throwing power, it reaches into recesses and covers the most complicated shapes. Since the M&T Bronze process is as easy to control and operate as others depositing single metals, it delivers *consistent* results.

If you want a decorative finish that sells on sight, send for data on M&T Bronze, or for an M&T plating engineer.

M&T Bronze plate rivals gold in appearance. Because of its quality and economy, it has replaced a former triple plate on trophies, is used to similar advantage on metal furniture, wire goods and other products.

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General Offices: Rahway, New Jersey
In Canada: M&T Products of Canada Ltd., Rexdale, Ontario

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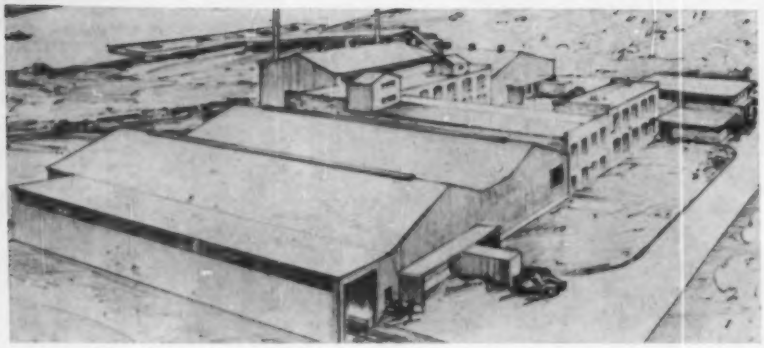

CONSTRUCTION STARTED ON NEW COWLES PLANT

Cowles Chemical Company, Cleveland, Ohio, has begun construction of a new chemical plant in Joliet, Illinois, according to an announcement by R. F. Huntley, president. "It is fitting," he said, "that we undertake this major expansion in this, our 75th Anniversary Year."

The company's major basic chemicals, detergent silicates, and products for metal finishers and others will be manufactured in Joliet upon completion of the plant next summer. The Promat Division of Poor & Company, Waukegan, Illinois, purchased by Cowles on September 1 of this year, will be moved to Joliet when the plant is ready.

The new location was selected to provide more efficient and prompt service to customers in the Midwest, South and West than is now possible from existing plants in Skaneateles Falls and Lockport, New York and Sewaren, New Jersey.

DIAMOND ALKALI TO MARKET NEW CHROMIUM PROCESSES

General Development Corporation has announced that its new Duramir chromium plating processes will be marketed by Diamond Alkali Company.

Under an agreement approved by both companies, Diamond Alkali will take over General Development's processes in a program which will include special training for Diamond Alkali personnel, preparation of technical data and manuals and, initially, a concentrated sales campaign in selected test areas. The sales and technical promotion program will be conducted by Diamond Alkali.

The Duramir processes owned by General Development are three in number. One of them provides for the direct plating of chromium onto aluminum or aluminum alloys by novel and simplified techniques. The second process provides for plating of a brighter, durable chromium onto a wide variety of base metals after application of a bright nickel plate. The third process, which is adaptable to newly developed plating systems, produces a corrosion-resistant, crack-free, mirror-bright chromium plate on aluminum as well as the other normal base metals, according to the announcement. Patents are pending on these processes.

Diamond Alkali and General Development said laboratory and pilot plant tests have shown superior corrosion resistance and adhesive qualities for all three processes.

♦

SILVER DOLLARS FOR SAFETY AT M & T

As part of a continuing and varied program stressing safety in the shop, Metal & Thermit Corporation's Carteret plant has initiated a unique program of rewarding a good safety record with silver dollars.

The plant, employing 215 people, includes detinning operations and production facilities for organic coatings, tin chemicals and ceramic opacifiers.

Silver dollars are given monthly to each employe based on the performance of that employe's safety group during the month. Similar departments and jobs have been classified as groups for the safety program. There are ten groups in all, each is headed by a group leader and a safety leader.

Completion of a calendar month without a lost-time accident or doctor's case entitles each member of a group to two silver dollars. The group leader gets five silver dollars and the safety leader receives four. A doctor's case requiring no more than two visits reduces the flow of silver dollars to a trikle—one for everyone in the group. A lost-time accident or three or more visits to the doctor excludes the group from participation in the program for the month.

The silver dollar program, initiated in September, will run for six months. Approximately $2500 will be distributed for a perfect safety record. Results will be reviewed and used to determine the next approach to the continuing task of striving for perfection in safety.

New plant of Technic, Inc. in Cranston, R. I. was dedicated at open house ceremonies Oct. 19 with attendance of 150 civic officials, customers, friends and trade associates of the firm.

The "Silver Dollar Safety Program" initiated in September by Metal & Thermit Corporation's Carteret plant paid its first dividends in October to 195 of the plant's 215 employes.

PLATING MAGAZINE TECHNICAL ARTICLE REPRINTS AVAILABLE

To maintain PLATING MAGAZINE's high standard, each and every technical article that you read in PLATING has been critically appraised and approved by a panel of experts on that specific subject before PLATING acceptance for publication.

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LEABRAMENT — greaseless, non-flammable, quick-drying, liquid abrasive for burring and polishing; can be sprayed or brushed on wheels.

BRIGHT BUFFING COMPOSITIONS

LEAROK — fine abrasive compositions with "no free grease" designed primarily for buffing or coloring pieces which involve cleaning difficulties; does not pack up in recesses and ornamentations.

LEA LIQUABRADE — clean-working, fast-cutting and mirror-finishing liquid buffing compounds, providing in effect continuous operations and substantial economies in compositions and buffs; clean and safe, non-flammable, non-explosive; many abrasive types and grain sizes for all non-ferrous metals, steel, stainless alloys, and plastics.

LEA LAPPING PASTE — micron size controlled abrasive paste for accurate and fine surface finishing.

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AD-LEA-SIVE — glue-base sizing adhesive for buffing and polishing wheels to improve application of Lea Compound, or loose abrasives; available in bar form.

LEA PLASTI-GLUE — fast-drying, flexible liquid adhesive, without abrasives, for preparing polishing wheels and abrasive belts.

LEA GRIPMASTER — high bonding strength cement for polishing wheels and belts; used in setting up longer lasting polishing wheels and belts for both ferrous and non-ferrous metals.

POLISHING WHEEL and BELT LUBRICANTS

LEA LIQUALUBE — water soluble liquid lubricant for polishing wheels and belts; can be sprayed or brushed on.

LEA LUBAR — bar form lubricant for polishing wheels and belts where glazing is not a problem.

cLEAn-GRAIN LUBAR — special bar form lubricant to eliminate glazing on polishing wheels and belts.

BRIGHT PLATING PROCESSES and ADDITIVES

COPPER-GLO — Bright Copper — a proven brilliant high speed bath exceptionally tolerant to impurities.

CUPRALL — produces high speed buffable copper where brilliance is not required.

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Q-STRIKE — A cyanide copper strike that produces a superior foundation for subsequent copper and nickel deposits.

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LEA ANALYTICAL METHODS — plater's short cut methods for analyzing plating solutions.

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LEATARDENT — anti-stain dip emulsion; prevents staining and tarnishing of plated surfaces.

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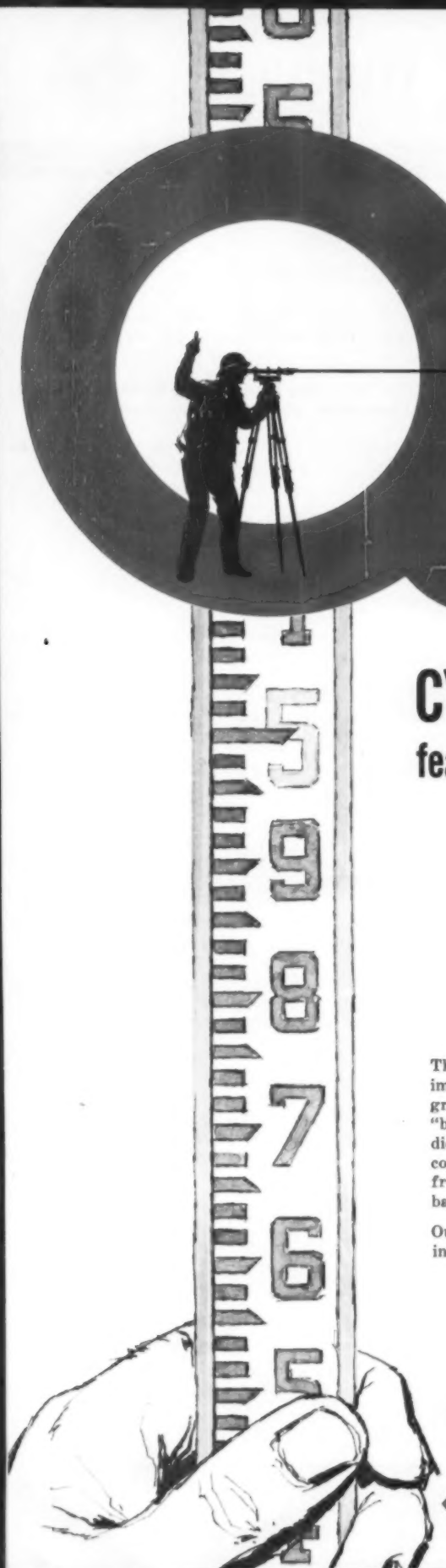

Q-level*

CYANIDE COPPER PROCESS

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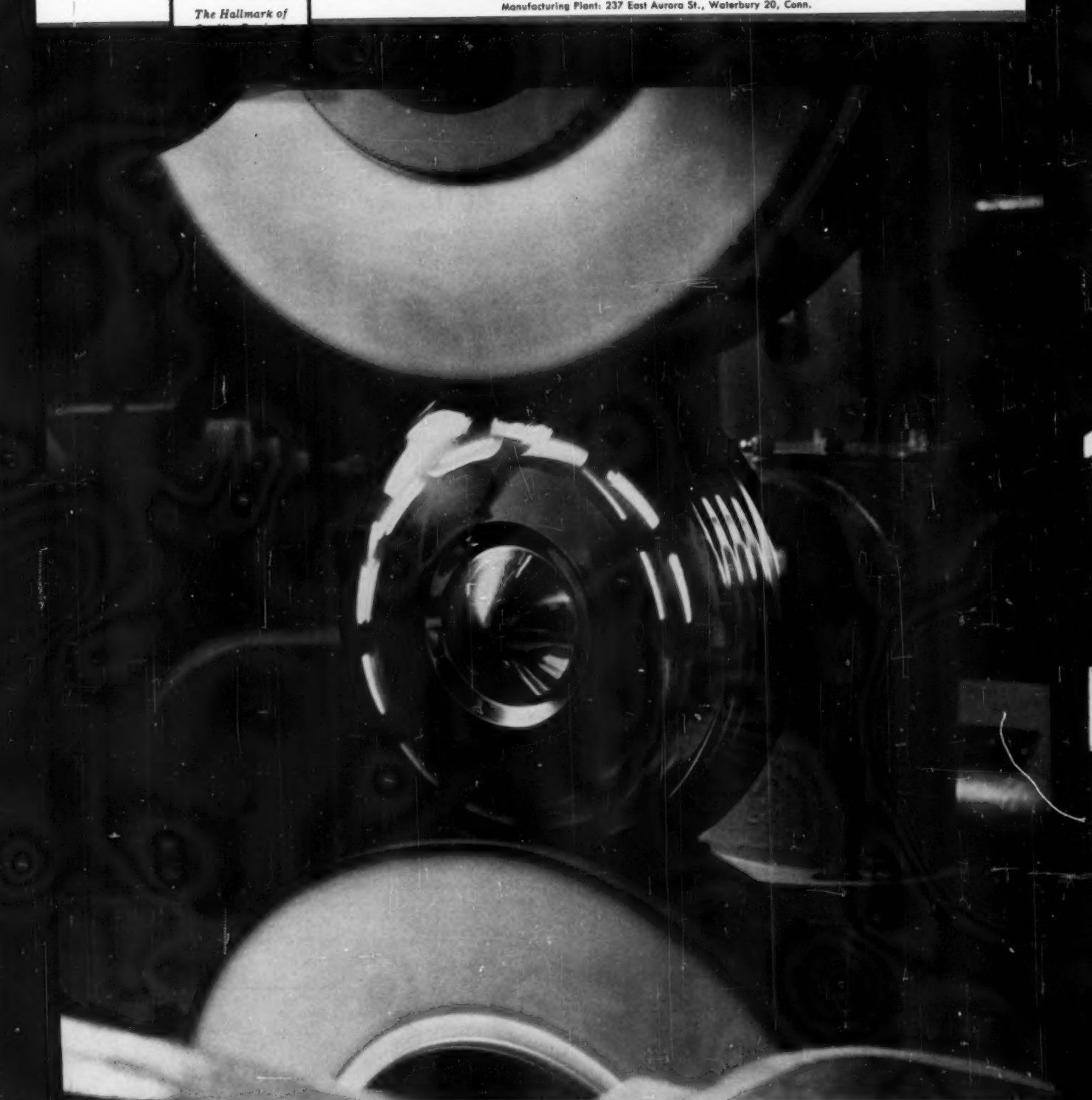

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INDUSTRY NEWS BRIEFS

U. S. GOVERNMENT PUBLISHES METAL COATING BIBLIOGRAPHY

Known as SB-409 Metal Coatings (1950-1960), this bibliography lists Army, Navy, Air Force, AEC and other research reports as well as translations on the development, preparation and application of protective and insulating coatings for steel, iron, tin, molybdenum, aluminum, magnesium, and other metals and alloys. The material covers electroplating, electrodeposition, electropolishing, vapor and vacuum deposition, plating and phosphate coatings, and Government-owned patents available for license. The bibliography may be purchased for 10 cents from the Office of Technical Services, Business and Defense Services Administration, U. S. Department of Commerce, Washington, D. C.

♦

HARSTAN EXPANDS PRODUCT LINE

Harstan Chemical Corp., 1247 38th Street, Brooklyn, New York, manufacturers and distributors of industrial chemicals, announces the expansion of their product line to include the manufacture of fluoboric acid, tin, lead, copper, nickel, and numerous other metallic fluoborates for the plating industry.

The fluoborates are available in a liquid concentrate solution.

♦

J. HOLLAND FORMS NEW SUBSIDIARY

A new organization formed for the purpose of handling used and rebuilt equipment sales has been announced by J. Holland and Sons, Inc. Called H&S Equipment Sales Company, operations will be conducted as a division of the parent company at 481 Keap Street, Brooklyn, New York.

J. Holland and Sons, Inc., founded in 1905, has served the metal finishing industry with new as well as rebuilt electroplating, polishing and spray painting equipment. J. Holland and Sons, Inc. will operate exclusively as a distributor for leading lines of equipment and supplies and continue the manufacture of its own makes of drying ovens, tumbling units and tanks. H&S Equipment Sales Company will concern itself with rebuilding, warehousing and financing used equipment.

♦

SOLVAY TO EXPAND MOUNDSVILLE PLANT

Plans for expansion of chlorine-caustic soda facilities at Moundsville, W. Va. have been announced by Solvay Process Division, Allied Chemical Corporation.

The new facilities, scheduled for completion in 1961, will increase chlorine-caustic soda production by approximately 20,000 tons annually.

ANODIZING RACKS

for **fast racking and unloading small parts**

Handles variety of work. Reduces handling, eliminating wires, springs, etc. *Economical—time saving.* Replaceable units can be assembled in any spacing arrangement desirable. Made in *aluminum.* Also made in *titanium* which does not have to be stripped after anodizing and which will withstand chemical bright-dipping solutions. Write for circular.

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PATENT ABSTRACTS

DR. D. GARDNER FOULKE
SEL-REX CORPORATION
Nutley, New Jersey

Copies of patents may be obtained by writing to Commissioner of Patents, Washington, D. C. Price 25 cents each.

2,944,954—7/12/60—METAL SHEET PRODUCTION—R. Yeck, assignor to American Smelting and Refining Co., New York, N. Y.

A method for producing metal sheet by plating the metal on a large drum is claimed.

2 claims, figure.

2,945,579—7/19/60—PLATING MACHINE—James Barton, assignor to Frederic B. Stevens, Inc., Detroit, Michigan.

A plating conveyor is described.

13 claims, figure.

2,945,750—7/19/60—POLISHING WHEELS—E. Gareis, Malmo, Sweden, assignor to Firma bi-flex Birkenstock K.G., Wuppertal, Germany.

Woven vegetable fiber polishing wheels are treated with x-amylase solution, dried, heated and treated with NaOH solution. The processed fiber may be treated also with a silica dispersion.

2 claims, figure.

2,945,778—7/19/60—ALUMINUM TREATMENT—R. Lipinski, assignor to Lord Mfg. Co., Erie, Pa.

The bondability of an aluminum surface towards organic polymers can be improved by treating the surface with a nitrosulfonic acid solution.

See also 2,945,779 claiming a similar treatment for titanium with 9 claims and a figure.

9 claims, figure.

2,945,789—7/19/60—SEMICONDUCTOR TREATMENT—R. Williams, assignor to Philco Corp., Philadelphia, Pa.

To produce accurately localized junctions between two semiconductor regions, treat with an electrified jet to deposit metal on said region.

7 claims, figure.

2,945,790—7/19/60—DEPOSITION OF LEAD DIOXIDE—J. Grigger, assignor to Pennsalt Chemicals Corp., Pennsylvania.

When depositing lead dioxide on the anode from lead nitrate solutions, the operation is improved by adding an alkylaryloxy polyethylene ethanol to the solution in the amount of about 0.5 g/l.

See also a lead dioxide deposition method for anodes 2,945,791 granted F. Gibson of Henderson, Nevada (11 claims).

20 claims.

2,946,707, 7/26/60—STORAGE BATTERY FLUID—H. Sperber, Hickam Drive, Dayton, Ohio.

Here's quick, low-cost heat
for tanks and degreasers

MALSBARY STEAM

10-year user, Pacific Rustproofing Co., Oakland, Calif., saves space, fuel and downtime with two 15 bhp Malsbary steam generators with condensate return system, to heat cleaning tanks and barrel plater. You can do likewise.

Fast Heat-Up. Malsbary flash-type coil produces live steam in 2-3 minutes from cold start. Since burner operates only when heat is needed—and there's no big boiler to keep hot, you reduce fuel costs materially.

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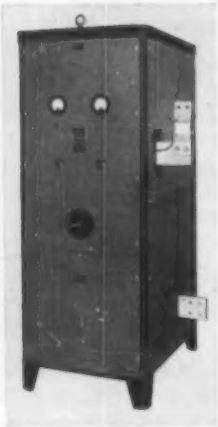

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An improved storage battery liquid contains 0.1 to 50 per cent of a stable, liquid organo siloxane.

17 claims.

2,946,728, 7/26/60—ELECTROPLATING ON TITANIUM—W. Foisel and C. Ellmers, assignors to Cleveland Pneumatic Industries, Ohio.

First deposit chromium on the titanium by chemical displacement in a bath containing at least 0.02 g/l of Cr^{+++} and 2.8 g/l of F– at 20–80C after which nickel is plated on the chromium from a Watt's bath at 10–65 asf.

2,946,729, 7/26/60—ELECTROLYTIC ZIRCONIUM—R. Dean, assignor to Chicago Development Corp., Riverdale, Md.

Zirconium is plated out at 500 asf in a molten bath using a steel basket containing comminuted zirconium as the anode at less than 1 asf.

See also an electrorefining process for titanium issued to R. Dean, 2,946,730 with 3 claims and figure.

1 claim.

2,946,731, 7/26/60—ELECTROLYTIC SHAPING—J. Falls, assignor to The Standard Electrical Tool Co., Cincinnati, Ohio.

An electrolytic grinding apparatus is described wherein the grinding wheel has a polarity opposite that of the work piece (—).

17 claims, figure.

2,946,734, 7/26/60—WIRE PROCESSING CONTACT—F. Roy, et. al., assignors to U. S. Steel Corp., N. J.

A contact assembly for the processing of wire or strip is described.

2 claims, figure.

2,947,122, 8/2/60—BUFFING WHEEL SPINDLE—O. Thiel, assignor to Midwest Supply and Mfg. Co., Ferndale, Mich.

An adjustable spindle for buffing wheels is described.

10 claims, figure.

2,947,672, 8/2/60—EXTRACTION OF VANADIUM, NIOBIUM AND TANTALUM—G. Ervin, Jr., and H. Ueltz, assignors to Norton Co., Worcester, Mass.

Extraction is accomplished by electrolyzing a fused halidebath.

32 claims.

2,947,674, 8/2/60—POROUS CHROMIUM—J. Andrisek and T. Gill, assignors to Metal Finishers Inc., Cleveland, Ohio.

Non-porous chromium on a surface is made an electrode spaced from another electrode to give 5–120 asf on the chromium plated piece, each electrode separated by a solution containing an alkali or ammonium hydroxide or salts and chromic along with sulfuric phosphoric or hydrochloric acid. Alternating current is passed through the two electrodes.

6 claims.

2,948,643, 8/9/60—ALUMINUM TREATMENT—G. Pimbley, assignor to Turco Products, Inc., Los Angeles.

A conversion coating for aluminum can be laid down by immersing in a bath containing 0.5 to 8.0 g/l of Zn., Cd. or Hg. a minor amount of a halogen containing anion and 0.5 to 9 g/l of chromate ion (as cr).

24 claims.

2,949,410, 8/16/60—HOLLOW MOLD—G. Bingham, assignor to Cambridge Rubber Co., Tareytown, Md.

Electroforming a boot mold is claimed.

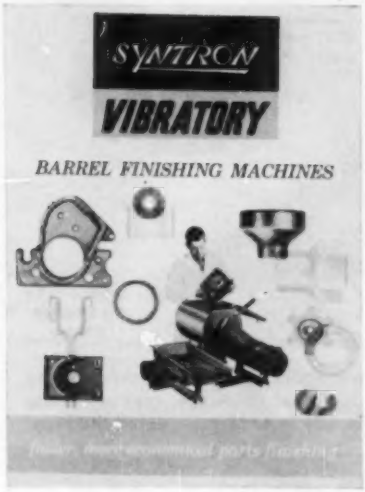
1 claim, figure.

2,949,411, 8/16/60—TITANIUM ANODIZING—K. Beck, assignor to Titanium Metals Corp. of America, New York, N. Y.

Titanium can be anodized in an aqueous solution of *p*H 3 to 12 containing at least two cations (alkali metals or NH 4) and phosphate in the amount of at least 70 g/l.

6 claims.

TRADE LITERATURE



L—1201. BARREL FINISHING—A new four-page brochure on a vibratory barrel finishing machine has been published by Syntron Company.

The brochure includes specifications, data and illustrations of the company's newer models for deburring, deflashing, grinding, descaling, polishing, burnishing or drying of unfinished parts.

L—1202. ELECTROLYTIC PROCESS UNIT—A 4-page bulletin in three colors describing the Model 500 Allen-Dizor is now available from Allen Aircraft Products, Inc. The new desk-size electrolytic process unit is designed to prepare hard-anodized samples in the lab, and to meet the demand for facilities for prototype or experimental work. In addition to hard anodizing, the unit can be adapted for conventional sulfuric and chromic anodizing, straight electroplating, chemical and electrochemical milling, electropolishing, electrolytic cleaning and etching.

L—1203. CHROMATE CONVERSION COATING—A new leach-type clear chromate conversion coating for either zinc or cadmium plate is fully described in Technical Data Sheet No. 61, a three-page usage and instruction sheet prepared by MacDermid Incorporated.

Called MACro Brite L-6, the product is a dry acid salt which is dissolved in water and nitric acid to produce clear white bright, clear blue bright or iridescent bronze chromate coatings on zinc or cadmium plate or zinc die castings.

Bright coatings or zinc and cadmium are produced by a two-step process; iridescent bronze coatings are applied by a single dip process.

L—1204. BATCH CLEANING—A new Bulletin No. 707-AL is offered by Magnus Chemical Co., Inc. The 12-page, illustrated booklet discusses industrial batch cleaning in some detail.

The importance of single lever operation of cleaning machines, minimum supervision during cleaning cycles and complete automation of some systems is stressed. Illustrated are standard-model Magnus Aja-Lif machines, special units, and individually designed and fabricated systems (multi-stage, walking beam, "merry-go-round") for specific batch-cleaning jobs.

L—1205. HARDCHROMIUM PLATING—A brochure has been made available by Hardchrome Electro Processing Corporation about various applications of hard chromium plating on ferrous and non-ferrous metals. The illustrated brochure is a compilation of three bulletins.

L—1206. PLATING BARRELS—Hanson-Van Winkle-Munning Co. has released nine new plating barrel and accessory equipment bulletins. The illustrated, color folders describe and picture the

(Continued on page 1424)

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General Plate RHODIUM SOLUTIONS

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General Plate Rhodium Solutions give unexcelled results in decorative applications requiring exceptional brilliance, protection against corrosion, tarnish, and adherence to base metal.

Solutions for industrial finishes provide deposits with a minimum of porosity and low tensile stress.

General Plate Rhodium Solutions are produced under strict laboratory control assuring the highest quality of product. Quantities from 5 grams up are supplied from stock in new unbreakable transparent containers. Write for bulletins PLA-4 and PLA-11.

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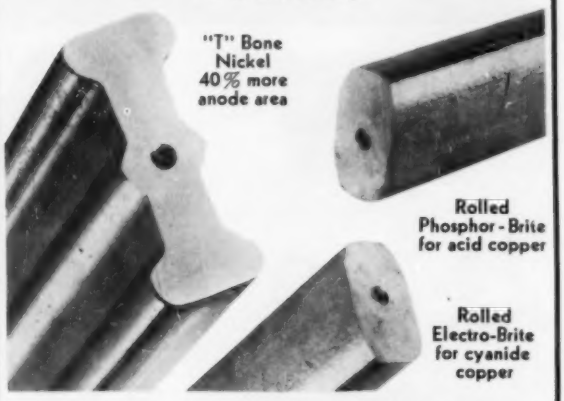

For further information about Univertical anodes for the plating industry or technical assistance, may we invite you to contact us directly in order to learn all the facts.

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Rhodium electroplate is suggested for these applications: on wave guides and microwave equipment which may be used in marine atmosphere; in printed circuits; in electrical contacts where light contact pressure and low voltages are involved... Rhodium is very hard and corrosion-resistant.

This Rhodium plating solution is easy to use. It operates over a wide range of temperature and current densities. We will be glad to plate samples without charge.

Consult our staff about plating problems.

SINCE 1901

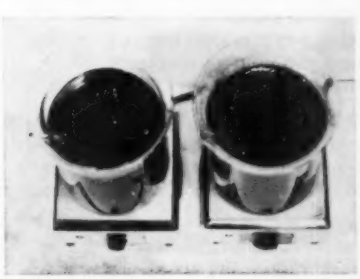
SIGMUND COHN MFG. CO., INC.
121 SOUTH COLUMBUS AVE. MOUNT VERNON, N.Y.

EQUIPMENT AND SUPPLIES

E—1201. PUMPS—Sigmamotor, Inc. announces the use of a special formulation of Hypalon tubing with their line of metering pumps for pumping sulfuric acid or other strong oxidizing agents. In the Sigmamotor pump, liquid is forced through Hypalon tubing by wave-like action of steel fingers. The liquid being moved never contacts any part of the pump. Hypalon is resistant to heat, ozone and oxidizing chemicals. The pumps are available in capacities from 0.5 cc to 4.5 g/min.

E—1202. ALKALINE CLEANER—Kelite No. 25E (Patent Pending), a chemical cleaning composition has been developed by Kelite Corporation. It is a dustless powdered composition said to be capable of removing difficult oily soils, fatty soils, and greases from hard surfaces.

E—1203. SOAK CLEANER—Introduction of Wyandotte Nuvat, a new type, powerful, free-rinsing soak cleaner based on synthetic-type detergents, is announced by J. B. Ford Division, Wyandotte Chemicals Corporation.



Designed for use in plating lines for soak or barrel cleaning, Nuvat also is intended for soak cleaning in vitreous enameling lines and for general soak cleaning of steel, stainless steel, copper, brass, nickel and magnesium.

A non-dusty, non-caking product that is readily soluble, Nuvat develops no disagreeable odors or fumes even at boiling temperatures, contains no cyanides, chromates or cresols, creates no waste disposal problems. It is said to be chemically balanced to provide exceptional life and designed to operate effectively at comparatively low concentrations, even under heavy soil loads.

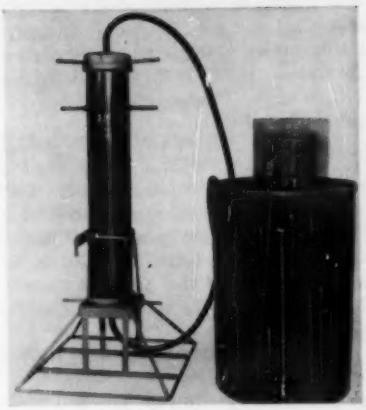
E—1204. DRYING PROCESS—The new patented TRISEC process is said to provide rapid, thorough, stain free drying of water-wet metal parts at low cost. The process and the TRISEC solvent are developments of Imperial Chemical Industries, Ltd. Phillips Manufacturing Company has

been granted a license for the manufacture of the equipment, use of the process and distribution rights of TRISEC in the United States. It is used for spot free drying after electroplating, phosphating, chromating, electropolishing, contour etching, acid pickling, bright dipping and alkaline de-rusting.

E—1205. BARREL FINISHING COMPOUNDS—Allied Research Products, Inc. has announced the addition of a line of barrel finishing compounds to its products.

A wide variety of these compounds is available for finishing practically any type of metal or plastic part. The materials from which the compounds are made include oxide chips, ceramic shapes, granite chips, limestone chips, natural stone and steel balls.

E—1206. FINISHING MACHINE—The new Hydra-Blast automatic machine is claimed to produce a variety of uniform and consistent precision finishes on eye glass frame pieces, jewelry and other decorative articles. Hard-to-reach areas on aircraft, camera, electronic, instrument and missile components may also be cleaned, deburred or descaled, replacing tedious hand operations.



E—1207. GOLD RECOVERY UNIT—The Gold Saver has been introduced by Technic, Inc., Providence, R. I., as the first commercial unit for recovering gold lost in electroplating. The Gold Saver includes a column of special resin and a pump for circulating through the resin column the water in which gold is dissolved.

E—1208. LEAD ANODES—Republic lead anodes can now be furnished with corrosion-resistant aluminum hooks which are said to withstand even the destructive fumes from high speed chromium plating solutions. The announcement is made by Republic Lead Equipment Co. Because these new extruded aluminum hooks will not corrode and pit, positive electrical contact between bus bar and hook is maintained undiminished throughout the anode's service life.

As with all Republic lead anodes, the aluminum hook is homogeneously bonded to the anode using an exclusive non-metallic flux and the specialized techniques which the firm uses to apply lead linings to sufuric acid tanks, where a positive bond is imperative.

The special type aluminum used in Republic aluminum hooks gives them an electrical conductivity of 53 per cent. They are available in both flat and knife edge types and can be furnished with Republic's hollow round, solid round, rectangular ribbed and flat types and conforming anodes.

FUTURE MEETINGS

Education is the business of AES. For National, Regional and Branch educational and other AES meetings ahead, see PLATING's section titled FUTURE MEETINGS herein.

PERSONALS

CARL R. SMITH has joined Hanson-Van Winkle-Munning Co. as sales representative in the Kentucky-Tennessee territory with headquarters at Louisville. He replaces **JOSEPH P. MUSCARELLA JR.**, who has transferred to the company's Philadelphia territory.

Prior to joining H-VW-M, Mr. Smith was associated in a sales capacity with a leading chemical manufacturing firm, serving the metal finishing industry.

Mr. Smith is a 1957 graduate of Bellarmine College of Louisville. He is an active member of the American Society for Metals and the American Electroplaters' Society.

Mr. Muscarella joined H-VW-M in 1953 as a sales engineer in the general equipment section, spending his first four years headquartered at the main offices in Matawan, N. J., and the remaining three years in the Louisville area. He holds a BS degree from Rutgers University and is a member of the American Electroplaters' Society.

♦

EVERETT E. CARLSON and **ALBERT A. NORTOF** have been promoted to the positions of chief chemist and process electrochemist respectively at Hanson-Van Winkle-Munning Co.

C. B. Smith

J. P. Muscarella

E. E. Carlson

A. A. Nortof

Mr. Carlson, who joined H-VW-M in 1939, was, until recently, manager of Service Laboratories for the company. Previously, he was a member of the plans department of a large abrasive manufacturer. In his new position, Mr. Carlson will be responsible for all functions of the Matawan general laboratory, including customer service, plating facilities, and the analytical laboratory.

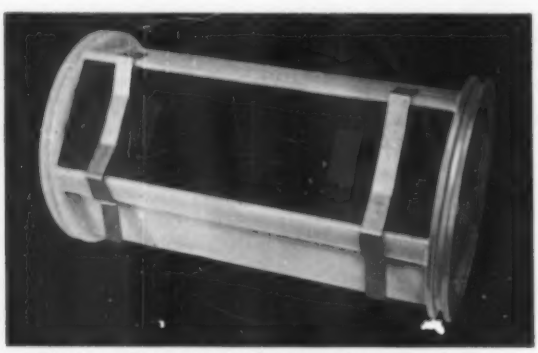
He is a member of the American Electroplaters' Society and holds a BS in chemistry from the University of Vermont, class of '34.

Mr. Nortof has recently transferred from H-VW-M's Cleveland office, where he was a field electrochemist. He joined the company in 1953.

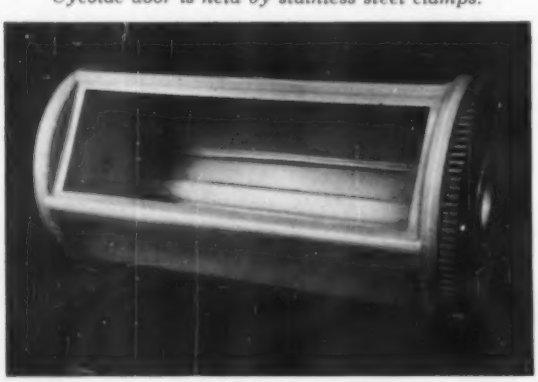
Prior to that, Mr. Nortof was an officer in the United States Army, serving in the Chemical Corps. He is a class of '50 Rutgers University graduate and holds a BS degree in chemistry. He is a member of the American Electroplaters' Society.

♦

JAMES L. DICKENS has joined Enthone, Inc. of New Haven, Conn., sub-



Horizontal barrel for belt drive. High-temperature Cycolac door is held by stainless steel clamps.



Horizontal barrel for gear drive cover removed.

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Now Imperial Industries offers improved plating barrels made of polypropylene—the advanced new plastic that is proving itself superior to virtually all materials previously used for this application.

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Imperial's new polypropylene barrels can be supplied to match standard barrels on your existing plating equipment. They are offered in a wide range of standard sizes and perforations.

Imperial also specializes in custom fabrication of special sizes and shapes in a wide range of materials—including Tempron, high temperature Plexiglas, and Cycolac. In addition, Imperial makes ducts, hoods, tanks, and offers a standard line of oblique plating barrels.

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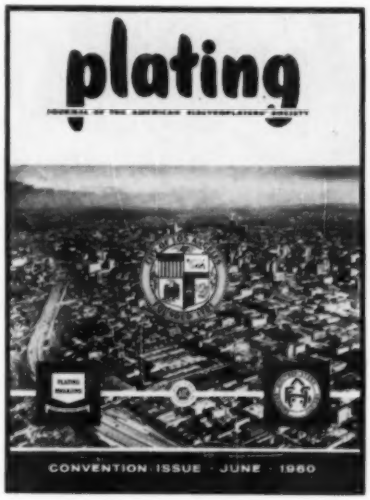

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(rolled depolarized add 3¢ per lb)

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LEAD, New York, cents per lb **12.10**

PALLADIUM, per troy oz . . . . . **$24 to 26**

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SILVER, cents per troy oz **91.375**

Chemicals

BORIC ACID, 100 lb bag N. Y. **12.10**

CADMIUM OXIDE, 100 lb drum per lb **$1.60**

CAUSTIC SODA, 100 lb, N. Y. **8.50**

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NICKEL SULFATE, 5000 lb **29.00**

POTASSIUM CYANIDE, 100 lb drum N. Y. **45.50**

ROCHELLE SALTS, 100 lb **53.00**

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SODIUM CYANIDE, domestic, f o b Chicago 200 lb drums **25.00**

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ZINC CYANIDE, 100 lb **60.75**

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sidiary of American Smelting and Refining Co., as a technical service chemist in the Enthonics laboratory.

Mr. Dickens received a degree in chemistry from Broome Technical Community College, Binghamton, New York, and attended Cornell University. He was previously employed as a research chemist by the Solvay Process Division of Allied Chemical Corp. in Syracuse.

J. L. Dickens

J. McDonald

JAMES McDONALD has been named technical sales representative of Heatbath Corp. in central and western Illinois and Iowa. Mr. McDonald will work out of the Chicago office at 701 North Sangamon Street, Chicago 22, Ill.

♦

RICHARD W. BENDHEIM has been appointed to head the newly created Plastic Division of the L. H. Butcher Co., Los Angeles, a subsidiary of The Udylite Corporation in Detroit.

The company is the West Coast representative for Reynolds Metals, Semet-Solvay, Durez Plastics, Olin Mathieson, Metal & Thermit, Wyandotte and others.

Mr. Bendheim, formerly director of sales for the Chemical, Ceramic and Paint Divisions of Butcher, will organize the new division as a specialized segment within the company structure to afford more effective sales concentration to the rapidly growing plastic industry.

♦

HARRY P. WISEMAN has been named supervisor—public relations of Diamond Alkali Company.

Prior to his appointment, Mr. Wiseman served as a columnist-reporter for the Elyria Chronicle-Telegram and as a free-lance advertising and publicity consultant for various northern Ohio organizations. For several years he was the advertising and publicity manager of Baker Industrial Trucks, Division of the Otis Elevator Company.

♦

ROBERT D. CASEY and **MICHAEL D. JULIANA** have been appointed technical service representatives of Oakite Products, Inc.

Mr. Casey will represent the company in Arizona, with headquarters in Phoenix. Mr. Juliana has been appointed to the Charleston, West Virginia territory.

The two new representatives completed an intensive seven-week training course in the New York laboratories of the firm.

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Neither AES's membership directory nor PLATING MAGAZINE mailing list are released to anyone for any purpose. As an accommodation to PLATING MAGAZINE advertisers wishing to link their PLATING product advertising with direct mail promotion, however, PLATING maintains a direct mail service featuring the largest audited paid circulation in the electroplating, metal finishing and allied arts field.

A bonafide example of the advertiser's proposed mailing must first be received and screened by PLATING. If mailing assignment is accepted thereby, the entire quantity must be shipped by the advertiser to PLATING MAGAZINE's Newark, N. J. office, pre-stuffed, for PLATING addressing and mailing. No mailing of less than a thousand pieces is acceptable. For further, fuller details, including costs, write or call Thomas W. Lowe, Production Manager, PLATING MAGAZINE, American Building, 443-445 Broad Street, Newark 2, N. J. (Telephone HUmboldt 2-3400).

MICHAEL SANDOR has been appointed manager of plating chemicals at Nuodex Products Company, a division of Heyden Newport Chemical Corporation.

Mr. Sandor, a graduate chemical engineer of Newark College of Engineering, joins Nuodex with 12 years' background in the chemical marketing field. He was formerly with Nopco Chemical Company, where he headed the Metal Processing Chemicals Division. He is a member of the Wire Association and the American Powder Metallurgy Institute.

♦

WALTER E. WILGAN, formerly of The Kelite Corp., has been engaged as East Coast technical sales representative by DuBois Chemicals, Inc., the Cincinnati based industrial and institutional chemicals organization.

From Valley Stream, Long Island, Mr. Wilgan was educated at City College of New York, and served his apprenticeship with The Permutit Company as a technician in the field of chemical water treatment. He is assigned to the Eastern (East Rutherford, N. J.) plant of DuBois Chemicals, Inc.

REMINDERS TO AES CHARTERED BRANCHES

Your Branch's 1960-1961 fiscal year membership expansion quota is 10% over the number of your Branch's members in good standing as at June 30, 1960, meaning 10% more members than your Branch membership on July 1, 1960 before any subsequent suspensions or resignations for 1960-1961 Per Capita Tax purposes.

♦

Your Branch, through its President of record, has been invited to nominate any member of the Society whom it chooses for consideration for the Charles Henry Proctor Memorial Leadership Award for 1960-1961. Signed by both your Branch President and Branch Secretary, your nominating return sheet is due in the hands of the National Executive Secretary by not later than April 1, 1961, accompanied by SEVEN copies of a resume of your nominee's 1959-1960 deeds upon which the nomination is being predicated.

♦

If your Branch is among those very few Branches that have delayed to now in appointing a Branch Research Finance Chairman to spearhead your Branch's effort to stimulate Sustaining Membership applications by industrial companies in your area, with the help of the Regional Research Finance Chairman for your territory, please do so promptly and submit his name to the National Executive Secretary's office at earliest possible time for processing.

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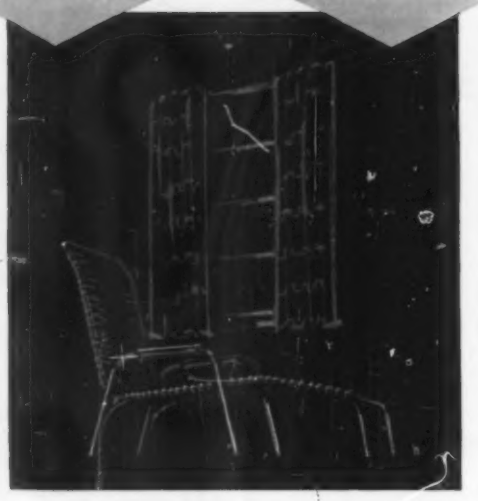

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Now, here's a fast, easy, economical way to almost double the protection against corrosion on your product. Simply follow up the IRIDITE process with a fast, easy application of IRILAC . . . and you've given your product extra protection for longer resistance to corrosive conditions, longer shelf or storage life protection from handling, and increased beauty for more attractive appearance and faster sales.

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An IRIDITE-IRILAC finish will provide longer life for storm doors, windows, outdoor furniture, auto parts and accessories, tubing or wire goods. And, you have a choice of color finishes such as natural aluminum and golden yellow. Other colors may be obtained by an additional dye operation.

ON MAGNESIUM

IRILAC over an IRIDITE No. 15 finish increases corrosion protection, and provides resistance to finger printing and abrasion on all types of products, with color appearance ranging from light to dark brown.

ON ZINC

IRIDITE plus IRILAC gives your product longer life and brighter appearance. Color choices range from clear IRIDITE to olive drab, plus colored dye finishes.

IRIDITE is the tradename for a specialized line of chromate conversion coatings that can be applied to any non-ferrous metal by brush, dip or spray methods—at room temperatures—manually or with automatic equipment. Upon application, a thin film forms which becomes an integral part of the metal itself, and thus cannot chip, flake or peel. No special equipment, exhaust systems or specially trained personnel are required.

IRILAC is the tradename for a line of clear protective coatings for all metals. As safe and easy to handle as water, they may be applied by brush, dip or spray methods. No exhaust or special fire protection equipment required. Adds protection and abrasion resistance to any base metal, plated part or parts treated with electrolytic or chemical post treatments, without chemical change.

For complete technical information on IRIDITE Chromate Conversion Coatings or IRILAC Clear Protective Coatings, write for FREE TECHNICAL MANUAL. Or, see the Allied Field Engineer in your area. He's listed under "Plating Supplies" in the yellow pages.

Allied Research Products, Inc.

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West Coast Licensee for Process Chemicals: L. H. Butcher Co. • European Agent: Sture Granberger, Storgatan 10, Stockholm, Sweden

Chemical and Electrochemical Processes, Anodes, Rectifiers, Equipment and Supplies for Metal Finishing

IRIDITE® Chromates | IRILAC® Coatings | ISOBRITE® Brighteners | ARP® Supplies | WAGNER Equipment

B-8 COMMITTEE MEETING

(Continued from page 1378)

Sub-committee V—Supplementary Treatments

R. E. HARR, Chairman

Section B on chromates on zinc (A. Mendizza, Chairman) will soon prepare a preliminary report, though results are inconclusive to date. Tests used include 20 per cent salt spray, test for hexavalent chromium content and spot tests. While the 20 per cent salt spray test is the one in most common use, the 5 per cent salt and acetic acid salt spray tests will also be investigated. Bell Telephone methods will also be explored, involving visual, adhesion, and spot tests. Discussion brought out the importance of thermal effects on corrosion resistance. Also emphasized was the importance of standardizing the "wiping" step in preparing panels for testing. Section H on chromates on aluminum (C. Ostrander, Chairman) is preparing to expose panels, and pointed out that a new Mil. Spec. is coming out and will be considered on the project. A similar program will be launched on chromates on magnesium (J. Stevens, Chairman). There was little new to report from the section on chromates on cadmium, phosphate treatments, and organic finishes.

♦

Sub-committee VI—Anodic Oxidation of Al and Mg

E. BARKMAN, Temporary Chairman

The section on measuring oxide coating thicknesses on aluminum by eddy current techniques (R. Paulson, Chairman) has completed its report, and it is now undergoing balloting. A section headed by G. D. Kissin will attempt to prepare a recommended practice for anodizing aluminum. Program now getting underway will study 8 alloys, pre-anodizing treatments, anodizing baths and methods, sealing methods, accelerated corrosion tests, and outdoor corrosion tests in 4 environments. Another factor which must be given attention is appearance of coatings, since not only pitting, but also hazing are sources of corrosion failures on anodizing aluminum. The problem is how to rate and measure such appearance failures. A task group headed by J. Kerr has looked into problems in reproducibility when testing sealed anodized coatings with dyes, under ASTM B-136-45. This group believes it has now overcome these problems by specifying a specific dye, of specified phosphate content, purity, *p*H, shelf life, cleaning procedures, etc. Next step will be to correlate the dye test with sealing performance. In the meantime, the revised standard will be letter balloted. A proposal was made on the floor to incorporate hard anodized coatings in the program.

NEXT MEETING: Cincinnati, February 1-3, 1961.

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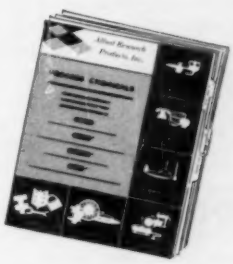

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Price and delivery information on a wide variety of plating room necessities, including ROLL-TOP Zinc anodes, FLAT-TOP copper anodes, ELECTROCOP Flat Copper anodes, Cadmium and Tin Anodes, Acid Replacements, Buffs, Chemicals, Cleaners and Maintenance Materials.

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JAPAN'S PLATING INDUSTRY VIEWED BY BLOUNT

PART III

Japanese plating plants visited by Ezra Blount in Tokyo and some of them in Nagoya were described in the first two parts of the story of his trip published in the September and October issues of PLATING MAGAZINE. Impressions of other plants in Nagoya and those in Osaka are related in here.

The new plating and manufacturing plant of Chiryu Giken Industrial Co., Ltd., Nagoya, was built about one year ago, after the president, M. Maejima, visited several plants in the United States. This factory has one of the few waste disposal plants in Japan. Plating effluent is treated to destroy cyanide and chromic acid wastes. Chiryu Giken operates a large fabricating, polishing, plating and paint finishing plant, located in several buildings. The company started as a plating plant, and has expanded its field to include the manufacture of office furniture which features chromium plated tubular parts. (See pictures 1 and 2.)

Bright copper is plated in a diaphragm copper plating system with continuous circulation and filtration. Temperature is maintained with the aid of a heat exchanger. The copper solution is air agitated. A very bright nickel deposit is obtained in an air-agitated solution. Rinsing is thorough—both immersion and spray rinses are used. Exhausts are located at proper points in the system. Plastic floats are used on the surface of the chromium plating solution.

The third technical meeting of the tour was held in the Mainichi Hall of the New Nagoya Hotel on August 13. Of the 180 job plating shops in the Nagoya area, 120 were represented at this meeting. About 150 persons attended the meeting, including two ladies who operate plating companies, and three visitors from Kokura—some 600 miles from Nagoya.

Mr. Blount arrived in Osaka on August 15. The Osaka-Kobe area is a major steel and metal product manufacturing center in which are located some 300 job plating shops and 35 plants which operate their own plating facilities. It is estimated that there are at least 125,000 gallons of copper solution, 90,000 gallons of nickel, and 30,000 gallons of chromium plating solution in Osaka.

Asahi Mekki Kogyo K. K. is the largest job plating shop in Osaka, having two large plants, 260 employes. Copper, nickel, chromium, zinc, and cadmium are plated on parts for the radio, electronics, television, electrical appliance industries.

Sato Senjuro Kogyosho is a job plating shop equipped to do hard chromium plating, copper-nickel-chromium plating, zinc plating, brass plating, barrel finishing, silver plating, clear melamine spray painting and baking. A large laboratory is used for routine solution analysis and control (Picture 4), as well as experimental work and research.

The company's 100 employes are currently working 10 hours per day, 6 days per week. There is one supervisor in each department, (eight in all) in addition to the plant manager, engineers, and chemical and metallurgical technicians.

The barrel finishing section has both horizontal and tub-type machines designed by Mr. Sato, and includes all necessary chips, stones or abrasive materials.

The zinc plating equipment includes two semi-automatic tanks for rack plating, fed from an automatic pretreatment unit, and several barrel plating machines—one continuous plating machine called a "mass plater."

The hard chromium plating plant is equipped with various types of manual polishing equipment and a lathe-mounted automatic roll or shaft polisher and buffer. Chromium plating equipment and process is conventional. Anodes are steel, lead-coated.

Mr. Blount spoke at a meeting of Osaka electroplaters held August 16 in the Imabashi Club. He was introduced by S. Nagayama, president of Nihon Token Shizai Co., Ltd., Tokyo. Prof. T. Hayashi, University of Osaka Prefecture, served as interpreter throughout the meeting.

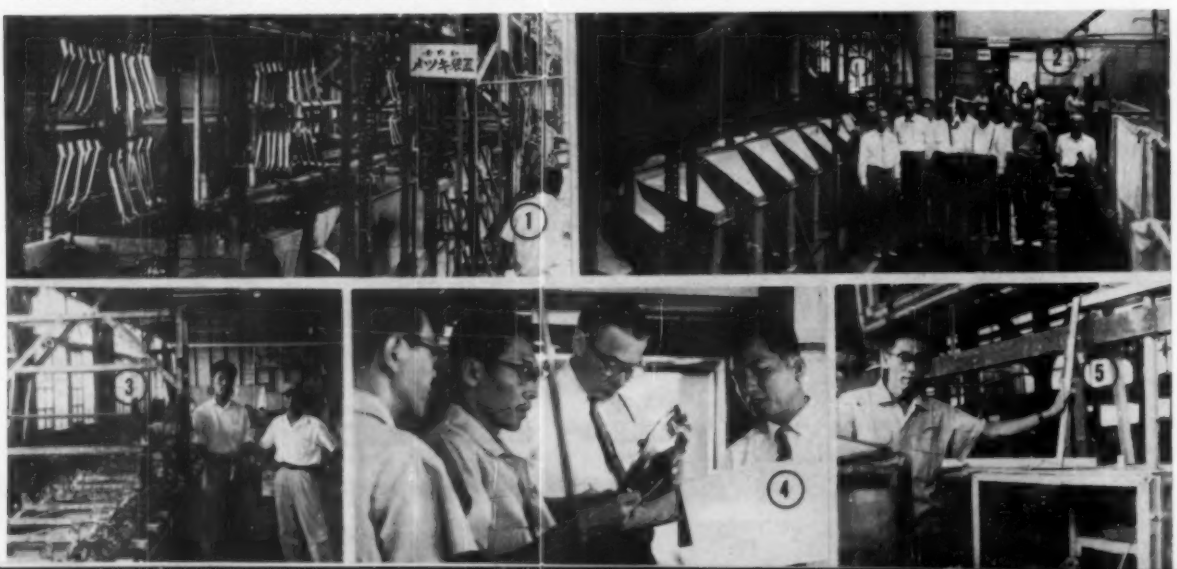
Ogata Mekki Kogyo K. K. in Osaka is a job plating shop performing barrel and rack zinc plating, copper-nickel-chromium plating, cadmium plating, and vacuum metallizing. Principal operation is the plating of nuts, bolts, and other parts for the hardware industry.

The Osaka Electroplating Association maintains testing and research offices, laboratory facilities, and classrooms at the headquarters location. Classes in electroplating are held each week. Members may call on the association for help in solving problems. This association has been active for the past 25 years.

The Osaka General Vocational Training Center is the largest of 40-odd such institutes in Japan, with 600 students. This institute, like the others, trains men to be foremen as well as skilled workers in many fields. The various institutes are organized under the Japanese Ministry of Labor, with each prefectural (state) government paying the cost of operation of its own training center. Students may be high school graduates, college graduates, workers displaced by industry changes who wish to train for another field.

Courses are usually of one year duration —48 hours per week, 52 weeks per year (5 or 6 days vacation). The Osaka Center is now only one year old, and it will take three more years to complete all the buildings.

(1) Automatic copper-nickel-chromium plating machine at Chiryu Giken processes steel parts for office furniture, or zinc die castings. (2) Cleaning and copper plating portion of the automatic plating machine. Note down-draft exhaust ducts shown along side of machine. M. Maejima, president of Chiryu Giken, at left. (3) Automatic zinc barrel plating at Asahi Mekki Kogyo, machine is 40 feet long. Motorized superstructure above the machine moves over barrel to be removed, lifts barrel and carries it to end of machine to be unloaded. Operator then reloads barrel and carrier replaces it in proper place in the plating machine. Tadeo Ueda (at left, near machine) is president of Asahi Mekki Kogyo Co. (4) Inspection methods were discussed with plant officials during tour of well-equipped laboratory. (5) M. Sato, executive director of Sato Senjuro, shown by one of bright nickel plating tanks. He designed rack return mechanism used on this semi-automatic plating tank.



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BRANCH NEWS

Total AES Branches U. S., Canada, Australia, December 1, 1960—59.

BLUE RIDGE
Tour C. M. Hall Lamp Plant

On October 7, 1960 the members of the Blue Ridge Branch were guests of the C. M. Hall Lamp Company in Clinton, North Carolina. Twenty-seven members and guests traveled to the eastern part of North Carolina to attend this meeting. The host company provided an evening dinner and afterwards a tour of their plant.

On the plant tour those attending had the opportunity to see the complete operation of this plant which manufactures automobile tail-lamp assemblies. There were several operations of interest to the group. These included die casting, burnishing, painting, buffing, automatic plating of copper, nickel and chromium, and final assembly of the parts.

All in attendance were pleased with what they saw and very grateful to company for the opportunity it afforded them.

The Branch elected four new members at this meeting.

Donald H. McGee
Secretary

BRITISH COLUMBIA
Branch Hears Report of National Convention

The first meeting of the 1960/61 season was held on September 30 at the Lougheed Hotel in Burnaby, with 29 members and guest present. Following the introductions, Program Director **W. Marquardt** gave a brief report on the speakers for the coming season. A very interesting talk was given by **Nelson Shepherd** on the AES Convention. He also spoke on the conducted tours, particularly the chemical milling plant tour.

C. Schlossareck
Secretary

BUFFALO
Helbig Talks on Activated Carbon; Christmas Party Set

The Buffalo Branch held its second meeting of the new season on Friday, October 7, at the Peacock Inn, Mayville, N. Y. with 42 members and guests in attendance.

President **Harold Shapiro** introduced the guests of the evening.

John Donaldson reported on the status of the membership campaign and has one new member application in process.

C. Fotheringham, chairman of the Christmas Committee, reported the annual Christmas Party will be held the evening of December 3, and will feature a cocktail hour, standing rib roast beef dinner, door prizes, entertainment and dancing. Tickets may be purchased at the door for $5.50 per person, guests are welcome.

It was reported by **Bert Kirchoff** and **Joe Ruff,** chairmen of the sick committee, that **Robert Potter** and **Ray Blechinger** have been quite ill and are recuperating at home. A letter of appreciation was received from Bob Potter thanking the Branch members for their thoughtfulness in sending a basket of fruit to him.

John Tiebor introduced the speaker of the evening, **W. A. Helbig Sr.,** of the Atlas Powder Co., who presented an interesting and educational talk on "Activated Carbon Purification of Plating Solutions." This was followed by an informative question and answer period.

CAPITAL DISTRICT
Swift on Metallurgy; Christmas Party Planned

The September meeting of the Capital District Branch was held at the Circle Inn, Lathams Corners at 8:00 p.m., September 12. Fifteen members attended.

President **Zygmund Nash** appointed a Christmas Party committee consisting of **Fred Infield,** chairman, **Bob Hill** and **Ed Freeburg.**

President Nash also spoke about the need for increased membership and this was re-emphasized by **Bob Wolf,** who pointed out that the membership dues might go up if membership does not.

At the conclusion of the business meeting, **Bob Wolf** introduced the speaker, **John Swift,** president of the John Swift Chemical Company, Canton, Connecticut. Mr. Swift's subject was "What the Metal Finisher Should Know About the Metallurgy of Steel."

Burt Finger
Recording Secretary

CENTRAL MICHIGAN
Stag Day Enjoyed; Saltonstall Talks on Agitation

The annual Central Michigan Branch Stag Day was held at the Arbor Hills Country Club, Jackson, Michigan on September 17.

The 115 members and guests enjoyed themselves with golf and the excellent program arranged by the committee. Drawing for the door prizes was held immediately after dinner.

The October 4 meeting of the Branch was held at the Roosevelt Hotel, Lansing, Michigan. The Branch was honored to have as its guest speaker, **Dr. Richard B. Saltonstall,** technical director of Udylite Corporation, whose subject was "The Role of Agitation in Electroplating and Allied Processes". A question and answer period followed the talk.

R. E. Tobin
Publicity

CHICAGO
Mendizza Discusses Corrosion; New Membership Activity

The October meeting of the Chicago Branch was held on Friday, October 14, at Petricca's Restaurant, 510 North Western Avenue. Two applications for membership were received and three new members were elected to the Branch. **Dick Connors** and **Rudy Hazucha,** of the membership committee, suggested that letters be sent to the job shops in the Chicago area to solicit new members for the Branch. Members of the Branch were also urged to solicit and bring a new member for the next meeting in November. **Paul Glab** urged all members to attend the Second Annual Midwest Regional Conference on metal finishing at South Bend, Indiana, on Saturday, October 29. **Joseph Andrus,** chairman of the Educational Program for the Milwaukee Convention in 1962, asked the members as to what type of papers should be presented for the program.

Clarence Kolzow, of Western Electric, introduced the speaker of the evening, **August Mendizza** of the Bell Telephone Laboratories. His subject was "Corrosion Problems in the Bell System." In the Bell System, corrosion problems occur because equipment is subject to different types of environment such as (1) indoor, (2) outdoor, whether urban, rural or marine, (3) soil and (4) under sea. The selection of metals to protect from corrosion are chosen (1) for their physical properties such as strength, durability, electrical, mechanical (2) by experimental tests in the laboratory (3) by experience gained in field trials (4) and results obtained from exposure test panels at New York, Steubenville, Ohio, San Francisco, Kure Beach and Florida. Mr. Mendizza told of how a zinc aluminum alloy water pipe corroded in a matter of a few months of service because of the high copper content present in the water. The water also possessed a strong odor of hydrogen sulfide due to a change in

BRANCH SECRETARIES

Branch News is required of all Secretaries monthly by AES Bylaws. First of the month is Branch News deadline for next PLATING issue. Any items on hand on that date will be carried in that edition. Later arrivals will appear in the issue immediately following. In reporting talks given by speakers before the Branch, please give titles of the talks, the speakers' full identification and any other pertinent information of interest to other Branches and PLATING's broad readership.

*p*H of the water which allowed certain bacteria to reduce sulfate to the sulfide. Zinc plated steel equipment was badly corroded due to storage in boxes made of green wood and in a hot and humid climate. There was enough acetic acid present in the wood and moisture to attack the zinc plate. The situation was remedied by using a chromate conversion on the zinc plate. Several miles of a lead cable, covered with steel strapping, corroded very badly because of a change in applied potential. Steel is anodic to lead in an alkaline environment but if the potential is too high, the polarity is reversed and the lead becomes anodic, thereby corroding. To overcome this change in polarity, the potential applied had to be lowered to a lower value.

Cadmium, tin and zinc are metals which form whiskers and short out equipment during service. Due to the plating process, stresses are formed which orient the crystals in such a way to form whiskers. The whiskers (filaments) are 2–3 microns in diameter and up to 3/8 in. long. Annealing after plating, relieves the stresses and the crystals are rearranged and the formation of whiskers is enhanced. In a corrosive environment, the silver-rhodium system is better than a nickel-rhodium system because the nickel corrosion products tend to smear on the contact surface causing trouble. The difficulty to solder tin plated brass terminal parts upon storaging for several months was due to the zinc in the brass migrating through the tin plate. The zinc migration was prevented by plating a barrier type of plate of either copper or nickel on the brass parts. Mr. Mendizza illustrated his talk with slides and after a lively question and answer period was given a rising vote of thanks for his very interesting talk.

Art Bartman, of Bell and Howell, will conduct a symposium on "Organic Finishing" in November.

Christopher Marzano
Publicity Chairman

CINCINNATI
Blount Tells of Plating in Japan

The meeting was called to order by President Leonhardt with 45 members and guests present. One application for membership was approved. The secretary briefed the group on the Midwest Regional Meeting to be held at Notre Dame University on October 29, and the 7th Annual Tri-State Meeting to be held in Columbus, Ohio on Saturday, February 4, 1960.

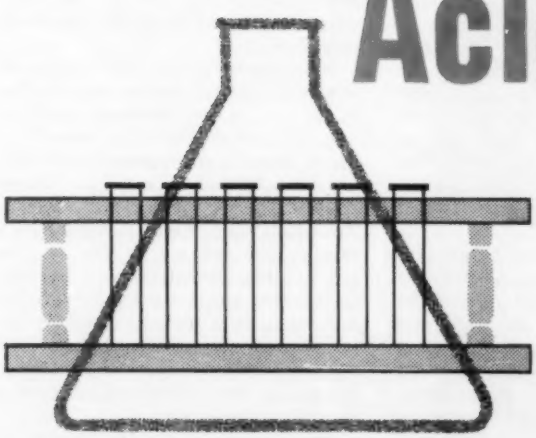
The speaker for the evening was Ezra A. Blount, editor of *Products Finishing* magazine. Mr. Blount presented a very interesting talk which was augmented by slides showing some of the production and research facilities which are active in the plating industry of Japan. As Mr. Blount pointed out, he was not just discussing industry in a foreign country, but he was discussing how a group of very keen competitors of the United States plating industry are operating.

The speaker drew some pertinent conclusions from his trip. Namely, 1. The quality of the plated products produced in Japan is now on a par with that of the U.S. 2. The Japanese now have good equipment and competent personnel. 3. Their research program, which is subsidized by the government, is up to date and aggressive. On the other hand, Mr. Blount pointed out some areas in which the Japanese were weak. 1. They do not have a good bright copper or bright nickel solution. 2. They lack a good variety of cleaners to properly process their work. 3. They rely on the standard 100:1 ratio chromium bath to do all of their chromium plating. 4. They lack good automatic buffing and polishing equipment. In spite of these drawbacks, the Japanese plating industry has become a major competitor in the world market. With the improvement in quality, the low cost of labor, and the assistance of the Government, the Japanese have been able to make great inroads in the world markets.

After a question and answer period the group adjourned to the social hour sponsored by the Pennsalt Chemicals Co., **Bill Wilson** and **George Smolens** as hosts.

David L. Kaplan
Secretary

Fluoboric Acid and METALLIC FLUOBORATES by HARSTAN



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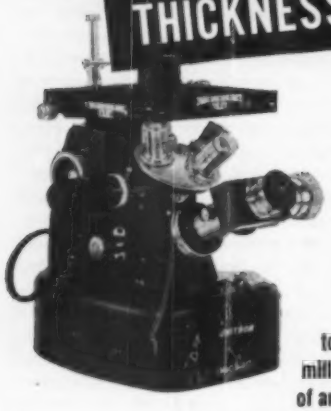

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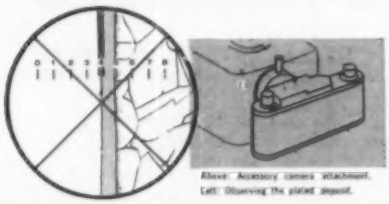

Above: Accessory camera attachment.
Left: Observing the plated deposit.

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COLUMBUS

Helbig is Speaker; Tri-State Plans Heard

The Columbus Branch held its first regular meeting of the year, September 9 at Battelle Memorial Institute. Thirty-two members attended. Plans for the annual Tri-State Educational Session and Banquet were reported on by Cal Smith, Chairman. This affair will be held at the Deshler-Hilton Hotel in Columbus on February 4, 1961. **Jim Harlow,** librarian, introduced the speaker of the evening, **W. A. Helbig** of the Atlas Powder Co. Mr. Helbig presented an excellent talk titled "The Application of Activated Carbon to Plating." After his talk Mr. Helbig spent nearly an hour answering questions from his very enthusiastic audience.

Mary Fulmer
Secretary

DALLAS-FORT WORTH

Beuckman and Blount Speak at First Annual Meeting

Some 60 Dallas-Fort Worth Branch members and their wives attended the first Fall Meeting, Wednesday, September 21, at Howard Johnson's Turnpike Restaurant. This meeting was especially important as it marked the first Annual Branch Banquet and the formal installation of 1960–61 Branch Officers.

President **Myron Browning** opened the meeting, after which the new officers were installed by **Frank Beuckman,** and incoming Branch President **William Aves** took over the chair. **Dr. T. C. Franklin** presented data on Research Project No. 20. Mr. Browning gave the final report on the Aerospace Finishing Symposium held at Fort Worth. **A. C. Fricke** was the recipient of the First Annual Branch Achievement Award, given for his efforts in behalf of the Branch over the years. Myron Browning gave a report of the Los Angeles Convention on the formation of a Southwest Regional Conference which will aid members in scheduling speakers for the various Branches. Delegates and Alternates were selected for the 1961 Convention at Boston.

The Branch was extremely fortunate in having two very excellent speakers for the evening: Frank Beuckman, national third vice president of the AES, and **Ezra Blount,** editor of *Products Finishing* magazine. Mr. Beuckman discussed future aims of the AES and suggested that, as an aim for the Society, the title of Librarian should be changed to Educational Chairman. It is through this office that educational talks are arranged.

Ezra Blount's talk on his trip to Japan proved very informative. He pointed out that the Japanese economy was very healthy as evidenced by many new cars and motorcycles, whereas just eight years ago the primary method of transportation was the bicycle. In the past, many of the goods shipped to this country from Japan were not up to our quality standards. However, Mr. Blount pointed out that although he did not see anything better in the plating line which would be helpful to the United States, the use of good techniques, low labor costs and the fact that the Japanese are now stressing better quality will make them a serious competitor. Mr. Blount concluded his talk with a movie taken during his first visit to Japan eight years ago and contrasted some of the changes which have since taken place.

Drawings were held by **E. R. Rinehart** for both ladies' and men's door prizes, with **Mrs. J. Savoie** winning a lovely pair of earrings, and **Bill Teer** a tackle box.

It was felt that the First Annual Branch Banquet was very informative and entertaining for both the Branch members and their wives.

Jack D. Haler
Recording Secretary

DAYTON

Gary Presents Plating on Non-Metallics; Membership Drive Launched

Forty members and guests of the Dayton Branch met on Wednesday evening, October 19, at the Yum-Yum Inn for a dinner meeting.

During the business session our guests, **Al Lipton, Paul Miller** and **Robert Van Fleet,** were introduced as were Cincinnati Branch members: **Bill Young, Dick Evans** and **Bob Wiedemann.**

Walter Moline, Richard Wright and **Richard Weaver** were elected Delegates and **Robert Fisher, Lawrence Hadlock** and **Byron Bowman** were elected as Alternates.

One membership application was favorably received.

It was announced that an evening course in plating will begin shortly after the first of the year. **Larry Hadlock** announced that arrangements had been made for a dinner meeting for members and their wives on December 14, as our annual Christmas party. This will be held at Annarino's Supper Club and will feature a speaker who will tell us how to raise checks. **Bob Fischer** announced a membership drive and stated that any member bringing in three applications will receive one ticket for the 15th Annual Educational Sessions and dinner dance. Any member bringing in five applications will receive two tickets as an award.

The attention of the Dayton Branch members was directed to the 7th Annual Tri-State Meeting to be held in Columbus on February 4. **William H. Safranek,** educational chairman, has announced an educational program which will include: **William Geissman,** National Lock Co., "Buffing Zinc Alloy Die Casting" and "First Phase Project 18"; **Manuel Ben,**

General Motors Corp., "Plating On Aluminum"; **Walter L. Pinner,** McGean Chemical Co., "Developments In Accelerated Corrosion Testing"; **Frank L. LaQue,** International Nickel Co., "Materials In Outer Space"; **Richard J. Anderson,** Battelle Memorial Institute, "Journey Into Ignorance."

The featured speaker of the evening was **Simon P. Gary,** vice president of Scientific Control Labs., Inc. Chicago, Illinois. His topic was "Plating on Non-Metallics." Mr. Gary reviewed the history of this type of metal finishing and explained the various methods which have been developed. The interest in his subject was fully demonstrated by the members participation in the question and answer period which followed his presentation.

Refreshments following the meeting were furnished through the courtesy of Hanson-Van Winkle-Munning Company.

L. A. Critchfield
Publicity Chairman

DENVER

Tour Plant of Ramo-Wooldridge Co.

The Denver Branch held its meeting October 13, 1960 at the Denver Division of the Ramo-Wooldridge Company. The group assembled at 6:30 p. m. for dinner. Following the dinner **Dick Freeman,** production manager of the local Ramo-Wooldridge plant discussed the field of activities of their local plant.

Following the talk, the members were conducted on a tour of the plant. Facilities for electroplating, manufacture of printed circuits, assembly of electronic components and finished products were inspected. During the short business meeting a list of topics was distributed by **Bob Martin,** president, so that the members could indicate their preference for future programs.

Elmer Schuster
Secretary

HAMILTON

Osborne Gives Paper on Electroless Nickel

The Branch held its first fall meeting on September 16 with the president **Ross MacLeod** in the chair. He introduced the speaker **J. Lawrence Osborne** of Keystone Chromium Corporation, Buffalo, N. Y., who spoke on the "History and Application of Electroless Nickel." Mr. Osborne was thanked by **Bill Findlay,** after which the speaker conducted a question-and-answer period, while refreshments were served.

Alan G. Andrew
Secretary

HARTFORD

Nickel Coatings Discussed by Saltonstall

The regular Branch meeting was held at the Bond Hotel on October 17, and 43 members and guests were present. Preceding the meeting a color movie on target shooting with the modern rifle was shown.

The guest speaker for the evening was **Dr. Richard B. Saltonstall** of the Udylite Corp. whose subject was "The Development and Present Status of Double Layer Nickel Coatings for Improved Protection."

Dr. Saltonstall reviewed the early developments of nickel plating as the high leveling bath introduced about 1945, and the soft semi-bright nickel which was ductile and easier to buff than the Watts bath and was used on bumpers. About 1948–1953 the fully bright coatings over the semi-bright coatings were introduced to eliminate buffing. The Corrodkote and the CASS test were studied as corrosion tests for these coatings of duplex nickel and showed that the duplex nickel was superior to the same thickness of bright nickel. Duplex nickel is not less than 20 per cent bright nickel over semi-bright nickel and this latter is usually free from sulfur whereas the bright contains some sulfur from the brighteners used. In the corrosion of chromium over duplex nickel, the bright nickel corrodes first and stops at the semi-bright coating or instead of penetrating it, the corrosion proceeds laterally and thereby takes longer to get to the iron. Various slides were shown of the corrosion testing of semi-bright coatings versus duplex nickel in the Detroit area and also at Kure beach.

The technical chairman for the evening was **Alex Dankevich.**

Stanley Platoz
Secretary

LANCASTER

Annual Ladies Night Well Attended

The October Meeting of the Lancaster Branch was its Annual Ladies Night

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affair. The party was held at the Hotel Hershey and was attended by 130 members, wives and guests. Entertainment was provided by Melvin Uhlrem of York, Pennsylvania.

Martin S. Frant
Secretary

LOS ANGELES

Branch's Plating Handbook Available; Blount Speaker

The regular meeting on September 14 was opened by President **Frank Virgil.** Guests were introduced by Sergeant-at-Arms **Oscar Grizat.**

First Vice President **Emmett Babcock** read the names of seven applicants for membership and then introduced a potential member for acceptance into the Society.

Bill Lidtke reported that copies of the Plating Handbook are now available and discount prices will be offered for quantity purchases.

Norm McEwan who attended the Western Regional discussion at the July 28 meeting during the Convention reported the formation of a Council of Far Western Branches of which the Los Angeles Branch would be a member. Speakers will be utilized by the member Branches at predetermined dates. Librarians from each Branch will be members of the Council. The attending membership then approved that the Los Angeles Branch become a member of the Council.

Bob Pooler reported that a note of appreciation had been received from the widow of Charles Wentworth for flowers sent by our branch.

Bill Thomas was appointed 1961 Educational and Dinner Dance chairman by President **Frank Virgil.**

Ezra Blount then highlighted the meeting with an excellent report of his recent tour of Japan and Hong Kong. Aided by slides, Mr. Blount showed plating plants from the most modern to the most ancient. His presentation was followed by questions from the group on many points of his tour.

Burton G. Adams
Publicity Chairman

LOUISVILLE

Nahstoll Speaks on Quality Control

The Louisville Branch went to Lexington, Kentucky for its October meeting. The affair held at the Campbell House had its hot and cold facets. It was cold during dinner which was held around the enclosed but as yet unheated swimming pool area. Because of the temperature **Frank Lamping** offered the use of his hotel room for the talk as all of the other hotel facilities were in use. With almost 40 people in the average size hotel room, the meeting then got hot.

During the meeting, Frank Lamping was thanked for being the sparkplug behind this trip and making the arrangements for us.

The talk by **George A. Nahstoll** of the Ford Motor Company was titled "Quality Control of Plating Processes." He told how several years ago Ford found that the plating on their automobile parts was varying considerably in service and that a better system was needed of evaluating parts before using them. The result is a system of hourly 16-hour Corrodkote Tests and rejection on a quality control plan whereby no parts are released from the plating area or vendor until the Corrodkote test is completed and proved the hour's production is up to specification. The talk was excellent. There were many questions after the talk.

Although the Louisville Branch's first trip to Lexington was fraught with difficulties, the excellent turnout of 42 members and guests assures a return to the heart of the bluegrass in the spring.

K. C. Reifsteck
Corresponding Secretary

MILWAUKEE

Dinner-Dance Marks Fall Season

The October meeting of the Milwaukee Branch was a dinner and dance party given at the Racine Elks Club by the Racine section of the Branch. **William Runge,** chairman of the event, stated that more than 120 were in attendance. The party was, as in the past, a great success due to the grand dinner and fine entertainment.

Curt Hunsaker, Branch librarian, announced that the December meeting to be held at the Maryland Hotel, December 2, will feature two speakers. **Al Korbelak** of Sel-Rex will talk on "Precious Metal Plating" and **W. R. Pascoe** of Polymer

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Clint Host
Chairman

MILWAUKEE

Metal Finishing in the Orient

Ezra Blount in a talk to the Milwaukee Branch at its regular meeting on Friday, November 4, described his observations of metal finishing shops in Japan, Formosa and Hong Kong.

According to Mr. Blount, the equipment in general use in Japan is very similar to the equipment used in the United States, and on the whole, the quality of equipment is comparable. He believes that their abrasive belts are inferior to ours.

Mr. Blount said that the technical level of personnel was fairly high because of formalized vocational schools; however, the Japanese platers receive very little technical assistance from their suppliers and are largely dependent upon the Japanese Electroplaters' Society and the Metal Finishing Society of Japan for assistance when it is needed.

Mr. Blount felt that the Japanese were using good practices, and that their work was of good quality except for rather low specifications. Tests applied to plated work is generally confined to thickness and salt spray. Seventy-two hours salt spray is most frequently specified. Copper-nickel-chromium systems are used with the copper thickness in the range of 0.2 to 0.8 mils, nickel 0.2–0.4 mils, plus 10 millionths of chromium. Zinc specifications are seldom higher than 0.4 mils plus chromating and cadmium seldom exceeds 0.3 mils.

While the plating in Japan is of very good quality, the Japanese do lack a wide variety of cleaners and bright plating solutions.

Mr. Blount reported that the Japanese economy is booming and that we may anticipate intensive competition. They are helped by relatively low wage scales and work weeks of 50 to 70 hours. Job shops are more prevalent than captive shops.

Mr. Blount reported that the Japanese do not have the wide variety of organic finishes we have, but their methods of application are much like ours.

Mr. Blount also visited Formosa where he found metal finishing comparable to that in Japan. He also visited Hong Kong where he found working conditions appalling, and extensive use of child labor.

Leslie L. Diveley

MONTREAL

Papers Presented by Branch Members

The first monthly meeting for the fiscal year was held at the Sheraton Mount Royal Hotel on Monday, September 19.

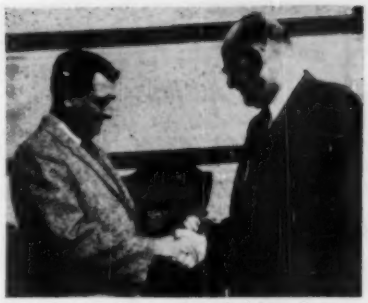
The meeting was called to order by President **J. Rennie**, with 24 members and 4 guests present.

The speakers for the evening were Branch members who presented papers which were originally prepared as part of an electroplating course sponsored by the Montreal Branch. The papers were: "Tin Plating from Alkaline Potassium Stannate Baths" by G. Katronge; "Gold Plating" by R. Senecal; "Physical Methods of Testing Metal Coatings for the Rotogravure Industry" by H. Wilson.

These papers were warmly received by the members and guests. Several members indicated that such papers should be encouraged in the future.

J. Reisenburg reported on the preparations for the forthcoming dinner dance to be held at the Queens Hotel on September 24. It was indicated that a large attendance was expected.

G. Katronge
Secretary



Mario J. Chiara, left, holding Louis Donroe Memorial Award plaque. Presentation was made by Newark Branch President John Banta.

DI CHIARA RECEIVES DONROE MEMORIAL AWARD

At the recent Metropolitan Regional Meeting between the Newark and New York Branches of the AES, the Newark Branch awarded Mario J. Di Chiara, chief chemist at Royal Plating Co., Newark,

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Was using nickel highly stressed.

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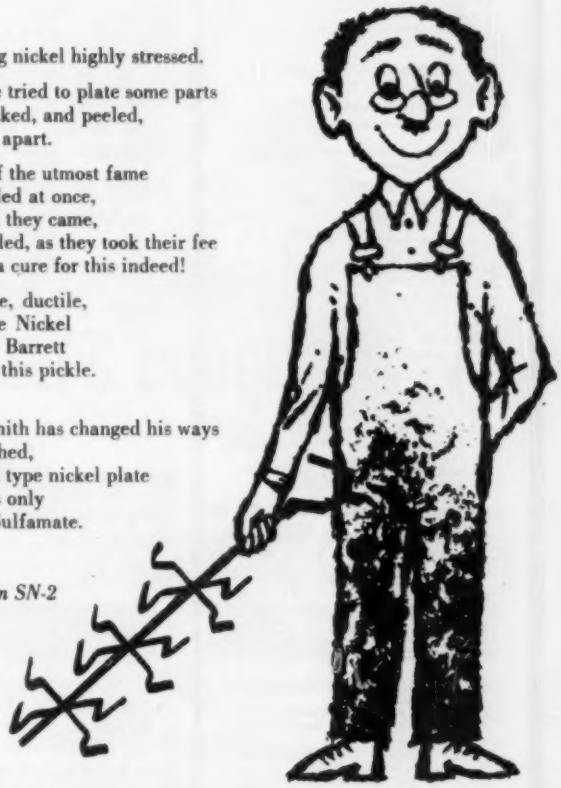

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N. J., the Louis Donroe Memorial Award for the best Timely Topic during the 1959–1960 year. The award is presented annually by the Branch to the local member who gave the most timely and practical short talk before the Branch, as judged by a selected committee.

Mr. Di Chiara's talk covered the practical aspects of color anodizing, describing the problems encountered and their corrections.

NEW YORK
Dvorin Discusses Waste Treatment; Plan Clarin Night

The October 14 meeting was called to order by President **Joseph Rembecki.**

Two applications for membership were forwarded to Board of Managers for further study.

Jack Weiner, chairman of Banquet Committee, made a favorable report.

New Branch by laws are being printed and will be mailed to all members.

The following members were unanimously elected as Delegates and Alternates to the Boston Convention: Delegates Joseph Rembecki, **Milton Nadel, Angelo Amatore;** Alternates, George Herrman, Isidore Friedman and Arthur Carlson.

Angelo Amatore is to head committee for **Dave Clarin** night to be held November 11, 1960.

Librarian Martin Pollack introduced Robert Dvorin, who spoke on, "Pollution Abatement." Mr. Dvorin covered three methods of waste treatment; classical destruction, Lancy integrator and ion exchange systems. The speaker covered the various systems very thoroughly, discussing advantages and average costs of such installations. This being a subject of interest to all platers, we had a very good turn-out and the discussion following his talk proved that the members appreciated Mr. Dvorin's paper. He received a rousing vote of thanks.

Fred Saras
Recording Secretary

PHOENIX
Officers Elected; Blount is Speaker

Our first fall meeting was held at the Interlude Club, Thursday, September 15. This meeting was held on Thursday instead of our usual Tuesday night to enable our speaker, **Ezra Blount,** editor of *Products Finishing,* to meet with us.

Floyd Huhn, president, opened the business meeting at 8:00 p.m. welcoming three guests, **Walt Walzak,** Sel-Rex Corporation, **Willard Bell,** Chemical Research Company and **Al Wellman,** Goodyear Aircraft.

Dr. Clyde Crowley, head of nominations committee, submitted the following slate of officers which was approved for 1960–61: President, Floyd Kuhn; first vice president, **James Weaver;** second vice president, **John Mullarkey;** secretary, **Paul Wible;** librarian, **Robert Hays;** treasurer, **Neva Johnson;** board of managers, Clyde Crowley, **Paul Madden** and **William Bath.**

James Weaver appointed **Joseph Motil** to serve as sergeant-at-arms for the year.

Ezra Blount described his visits to the Japanese plating industry and showed a color movie of hard chromium plating.

Two applications for membership were submitted to the board of managers.

Paul M. Wible
Secretary

PHOENIX
Lowenstein Presents Tin Alloy Plating; Christmas Party Scheduled

Our October 11 meeting was held at the Interlude Club.

Floyd Huhn, president, presided. Three guests were welcomed.

Two Branch delegates were named—**Ron Dezember** and **Bob Hays.**

Announcement was made of the coming Christmas party which will be held December 9 at the Pulaski Club, 4331 East McDowell Road. **James Weaver** was appointed as chairman of the entertainment committee for the event.

George Reich was elected to the board of managers to fill the unexpired term of Dr. Crowley.

Bob Hays, Branch librarian, introduced **Dr. Fredrick Lowenheim** of Metal and Thermit who gave a very interesting talk on "Tin Alloy Plating," covering especially the tin-copper, tin-zinc, and tin-nickel systems. The talk was followed by a question and answer period.

Paul M. Wible
Secretary

PITTSBURGH
Weisberg Talks on Precious Metal Plating

The regular monthly meeting was held at Gateway Plaza on October 12.

A new member was elected.

Branch Librarian, **Walter R. Johnson,** introduced the guest speaker of the evening, **Alfred M. Weisberg,** vice president of Technic, Inc. The subject presented by Mr. Weisberg was "Quality Control in Precious Metal Plating." A brief discussion period followed the informative talk.

Clyde A. Mungall
Secretary

ROCHESTER
Thornton Made Branch Honorary Member; Helbig Speaker

In the absence of President **Cipolla,** our second regular meeting on October 3 was called to order by First Vice President **Charles Fedeor.** Three guests were introduced.

For his dedicated help to our Branch, **Cecil Thornton** was unanimously elected an honorary member.

Christmas Party Chairman **Pottridge** reported that tickets were available for our

annual get-together, this time at Midvale Country Club. From his report, it looks like a bang-up affair, as usual.

Fred Thiem moved that our honorary members be introduced with a luncheon prior to the regular meeting. It was decided to act further on this at the next board of managers meeting.

Mr. Fedeor requested members to promote our Branch to prospective members. A membership promotion letter will be sent to local manufacturing plants. Second Vice President **Elston** will send it to those interested in the science of metal finishing.

Librarian **Loring Carson** introduced **W. A. Helbig** of the Darco Division of Atlas Powder Company.

Mr. Helbig's talk on activated carbon covered all phases from the manufacture of carbon to the curse it can ward off in a plating bath. His detailed report on how to buy a filter drew much interest. Mr. Helbig's talk helped solve many problems for members present.

E. A. Pottridge
Acting Secretary

ROCKFORD

Eley Talks About Jet Age

Rockford Branch held its first regular meeting of the season at the Woodward Governor Company main auditorium on October 10. President **Harold Ellis,** in a short business meeting, stressed the importance of early reservations for the 2nd annual Midwest Regional Conference to be held at Notre Dame University on October 29 and it looks like the Branch will be very well represented. Librarian **Bob Campbell** outlined the plans and program for our annual Ladies' Night to be held November 14 at the Holiday Inn in Rockford.

Delegates and Alternates to the National and Regional societies were elected as follows: Delegates, Harold Ellis, **William (Bill) Giessman** and **Murray Rounds.** Alternates: **Alexander Alexander, Dick Legge,** and **Leonard Weeg.**

M. C. Eley, gas turbine controls development engineer with Woodward Governor Company talked on the "Jet Age", outlining the history of jet flight, its special fuel requirements, the methods of controlling jet fuels and showed some of the fuel controls manufactured by Woodward Governor for military and civilian jets. Excerpts from a $100,000 training film on jet fuel control and maintenance were shown prior to a guided plant tour.

In the question and answer period, it was brought out that the jet had placed great demands on the plating industry for heat resistant finishes since fuels as high as 400F and oils up to 500F are common. The plating must therefore be ductyl and hydrogen embrittlement must, of course, be at a minimum. Woodward Governor's plating department, under the supervision of **Bob Burknap** is doing considerable work with hardcote aluminum as a high temperature finish for such projects as the X-15 jet.

Alexander Alexander
Publicity

ST. JOSEPH

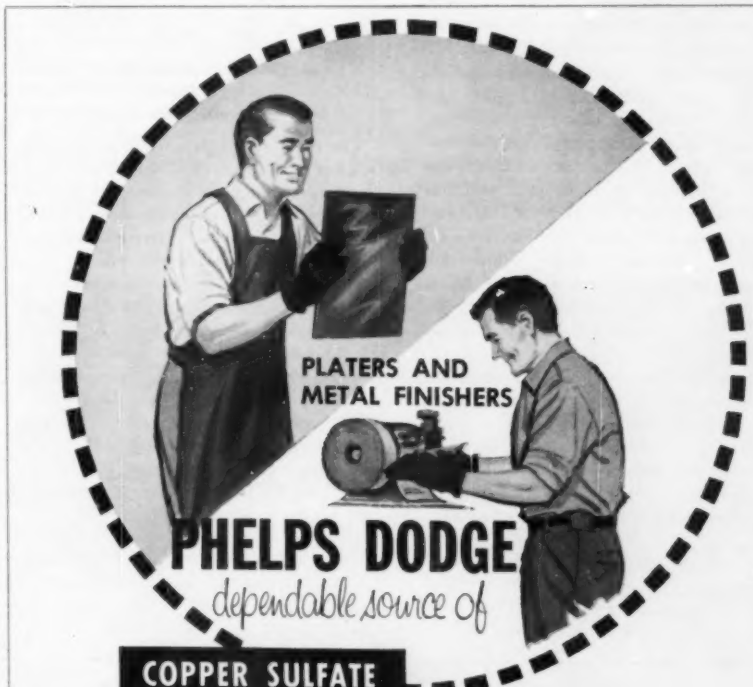
Shafer Heads Slate of Officers

Fifty-two members and guests attended the first meeting of the 1960–61 season on October 5. President **Walter Manson** called for a round robin of introductions after which the election of new officers was held. The new officers are: President, **Theodore D. Shafer;** first vice president, **Jack Petersen;** second vice president, **Louis Ragues;** secretary, **Henry Meers;** treasurer, **George Shuman;** librarian, **John Devendorf;** board of managers: **Joseph Curtis, Richard Aiken and Victor Peterson;** delegates for the 1961 Convention: Theodore Shafer, **Ralph Wysong** and **Gene Roth;** alternates: **Elmer Brady,** Jack Petersen and **Dr. Harold Wiesner.** "Duke" Wysong, Past National President, installed the new officers and spoke briefly on the responsibility of these officers to the Branch members and the importance of their duties.

The new president, Ted Shafer, thanked the membership for the honor. He called on Duke Wysong to report on the Los Angeles Convention. The fine attendance there resulted in an extremely successful convention.

Gene Roth, chairman of the 2nd Annual Midwest Regional Conference, urged all to attend the all-day session at the University of Notre Dame on Saturday October 29. **Lou Ragues,** exhibits chairman for the conference, asked assistance in bringing in more displays.

The new librarian, **John Devendorf,** introduced the speaker of the evening. **Charles H. Stade,** liaison engineer, Kanigen Division, General American Transportation Co. His subject, "Nickel-Phosphorus Alloy by Chemical Reduction."



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The basic chemical reactions of the process are nearly 100 years old but until recently were considered a laboratory oddity. Dr. Abner Brenner of the Bureau of Standards looked into the process as a possible method of repairing naval gun barrels. Unsuccessful attempts to electroplate nickel on the inside of tank cars led to further examination of the "electroless" process. After considerable effort and research, the process was controlled to the degree that 0.6 to 1 mil per hour could be reliably deposited. Theoretically, there is no maximum thickness.

Mr. Stade explained the many and various applications of electroless nickel. It may be plated on iron, steel (300 and 400 series), copper, brass, aluminum, titanium, beryllium, nickel and some plastics. The nickel-phosphorus alloy oxidizes rapidly above 400F. It is stable up to 800F in inert gases and superheated steam so long as oxygen is absent.

The corrosion resistance of the alloy is excellent, particularly toward caustic solutions (from *p*H of 5 up to 14) ammonia dissolves the alloy rapidly at any *p*H.

Parts having complex shapes and geometry are particularly suited for electroless plating. Throwing power problems inherent to electroplating processes are completely absent. The nickel-phosphorus alloy is applied to aluminum, stainless steel and beryllium to allow for soldering. A thickness of 0.4 mil is sufficient for good bonding. Another unique application prevents galling of titanium screws, bolts, etc. where the metal works against itself.

The hardness of the alloy is very sensitive to heat treatment; therefore, heat-treatment of one of the mating parts and not the other yields both good corrosion resistance and desirable anti-galling properties. It is common to plate stainless steel heat exchanger tubes on one side only to attain the best effective combination of corrosion resistance against two corrosive media.

Limitations of the process include certain metals that cannot be plated (lead, zinc, tin, antimony and most poly-metallics). If the configuration of the part is such that proper relief of evolved hydrogen is not possible, it may not be plated. Very narrow slots as those resulting from a weld bead on one side only, may not be plated because the plating solution cannot enter them.

In general, the corrosion resistance of the alloy may be compared to nickel. The porosity of the deposit is less than that of electrodeposited nickel, but is not as pore-free as often thought. The alloy as deposited is quite hard—Ro50, and may be hardened further by heat-treatment up to Rc70. The ductility is not too high—but high temperature heat treatment greatly increase it.

The structure of the as-plated alloy is amorphous and may be considered similar to glass and certain plastics that behave as super-cooled liquids. Subsequent heat-treatment above 400F results in a crystalline structure having the formula Ni_2P.

Henry A. Meers
Secretary

ST. LOUIS

Nichols Speaks on AES Affairs; Membership Drive On

The regular monthly meeting was held October 12 at the York Hotel. There were 24 members and guests present for dinner. Thirty members and guests were present when our President, **George Koderhandt,** called the meeting to order.

There were three new members accepted on a motion by **William Piel,** seconded by **Lou Berra** and passed without opposition. Communications consisted of a notice of the Midwest Regional meeting to be held at Notre Dame, letter from Headquarters pertaining to membership expansion, sustaining membership report, letters concerning Scientific Achievement Award and Honorary Membership.

A motion by **Gerard Clooney** that the new stationery have the Sustaining Members names shown was seconded by **Craig McAlister** and passed unanimously. **Andy Julius** reported that the 1960 Convention in Los Angeles was well attended and St. Louis had a good showing of members there.

Lou Berra reported the Banquet made $225 profit. The acoustics of the room were bad and we are going back to the Chase Hotel next year.

Gerard Clooney reported he had mailed invitations to companies to join the AES Research Program as Sustaining Members of AES. We haven't obtained any new members yet but hope to gain a few.

President Koderhandt appointed Craig McAlister as welfare committee chairman, **Frank Menniges** as banquet committee chairman. Craig McAlister reported he received a letter from **Joseph M. Andrus** requesting him to contact members of our Branch to see if there were any papers that would be offered for presentation at the 1962 Milwaukee Convention.

A discussion was held relative to the meeting place and the attendance—whether we should consider changing, or if membership opinions should be sought. Librarian, **Ken Robins** will attempt to get opinions by enclosing questionnaires in our next mailing.

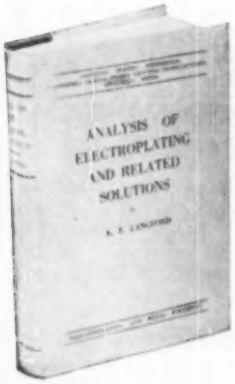
Ken Robins outlined the tentative program for this year. **Dr. Saltonstall** of Udylite Corp. will talk in November, **Dave Nelson** of Monsanto Chemical Co. in December. The January meeting will probably feature a talk on ultrasonic cleaning, pickling etc. There will be a plant trip and a talk on waste disposal.

Ken then introduced **John P. Nichols,** National Executive Secretary of the American Electroplaters' Society, who came here from Headquarters in Newark to talk to our members. It was pointed out it was the first time since October 1955 when Clyde Kelly was President that our Branch had been honored by a visit from a National Officer.

Mr. Nichols talked about the organization, the awards, the research projects, the convention and other AES subjects. The meeting was very interesting and Mr. Nichols received a rising ovation for his enlightening talk.

Ward Kelly
Secretary

NEW EDITIONS



Analysis of Electroplating and Related Solutions by K. E. Langford, F.R.I.C., A.I.M. 2nd Edition December 1958. 423 pp. Price $9.25 postpaid.

Completely revised. 40 new methods, mostly based on E.D.T.A., have been added.

Contains over 300 methods for the determination of principal constituents and impurities, together with chapters on Sampling, Control of Cleaners, Pickles, Dips, Etches, Phosphating Solutions and Electrobrighteners, the analysis of Plating Salts and of Water, Physical and Physico-chemical Methods of Analysis and the Preparation of Standard Solutions for Volumetric Analysis.

'The most important work on the subject'—*Metal Finishing.*

'The standard volume . . . strongly recommended' —E. A. Ollard in *Metallurgical Abstracts.*

Surface Treatment and Finishing of Aluminium by S. Wernick, Ph.D., M.Sc., F.R.I.C., F.I.M. and R. Pinner, B.Sc. 2nd Edition August 1959. 607 pp. + XLV. 204 figs. 120 tables. Price $13.25 postpaid.

Comprehensive and up-to-date survey of all available processes including Mechanical Treaments, Electro- and Chemical Polishing, Cleaning, Etching, Conversion Coating, Anodizing, Hard Anodizing, Properties of Anodic Oxide Coatings, Plating, Organic Finishing, Vitreous Enamelling and Metal Spraying.

This second edition is largely rewritten and incorporates a great deal of new matter.

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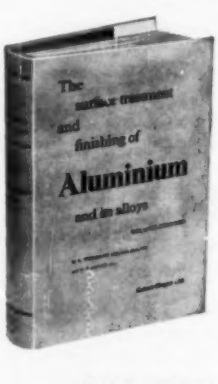

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SAN FRANCISCO
Tour United Air Lines Plant

The October 13 meeting began at 7:00 p.m. with dinner at the International Inn, South San Francisco.

Through the kind auspices of United Air Lines there was a complete tour through their plating, cleaning; assembly and jet engine overhaul plants. The tour was headed by **William Hecht,** United Air Lines public relations official.

There were 41 members and 16 guests on hand.

The tour lasted over an hour and a half and was quite complete. Members had a unique opportunity to inspect every single component part going into both the reciprocating and jet engines used by United Air Lines. Actual parts being plated were inspected by the members. It was a very pleasant and educational evening.

C. E. Snelgrove
Secretary-Treasurer

SEATTLE-PUGET SOUND
Blount and Marcum Speak at Meetings

The September meeting of the Seattle-Puget Sound Branch was held on September 1.

Ezra A. Blount, returning from touring the Japanese plating plant, some of which he had visited several years ago while in the Air Force, stopped over in Seattle to speak to our members.

Mr. Blount gave a very interesting talk on the development, conditions and problems in the Japanese plating shops. He also showed moving pictures of some points of interest.

The October 20 meeting was held at the Arctic Club.

Elburn Marcum of the E. I. Dupont company was the speaker and gave an interesting history of copper plating solutions. The composition of the baths, the characteristics of the various baths during the years and changes made to produce brighter, smoother, cheaper, and faster copper plate. Color slides were shown on a proprietary copper plating solution the Du Pont Company is now producing. A very small number of members were present to hear Mr. Marcum.

Helen Archibald

SOUTHEASTERN
Branch Visits Buff Cloth Mill

The Southeastern Branch, with its yen to do something different and be the first about it, met in Gainesville, Georgia for its October 14 meeting, and visited the world's largest buffing cloth mill.

We were the guest of the Pacolet Plant No. 6 of the Deering, Milliken and Company, Inc. The hosts for the occasion ncluded **E. R. Loomer Jr.** of New York and **Winston F. Garth,** the local Mill Manager. Arrangements were coordinated through **George W. Taylor,** Branch program chairman, and **H. R. Stogner Sr.,** secretary.

The program began at 2:00 p.m. with the showing of a movie on fabric manufacture. This movie was run continuously until 4:30. At 2:30 guided plant tours were conducted. Each group was taken first to the warehouse where raw cotton was inspected. We followed the cotton fiber all the way, step-by-step, through opening and cleaning, picking, carding, breaker drawing, roving, spinning, spooling, warping, slashing, weaving, inspecting, shipping. Along the way job shop platers pointed out their plating contributions to the textile industry on ring travelers, drop wires, shuttle parts, shafts, combs, etc. It was truly interesting and beneficial for both the plater and the textiler to get together and exchange thoughts. The platers were pleasantly amazed at the high quality control exhibited at each of the many stages in the processing of buff cloth. Perhaps the influence of such science at the earlier stages will encourage the platers to think of and practice more quality control at their end of the buff. Certainly they saw the trouble to make it, they should now exercise more appreciation and more science in taking advantage of the founda-

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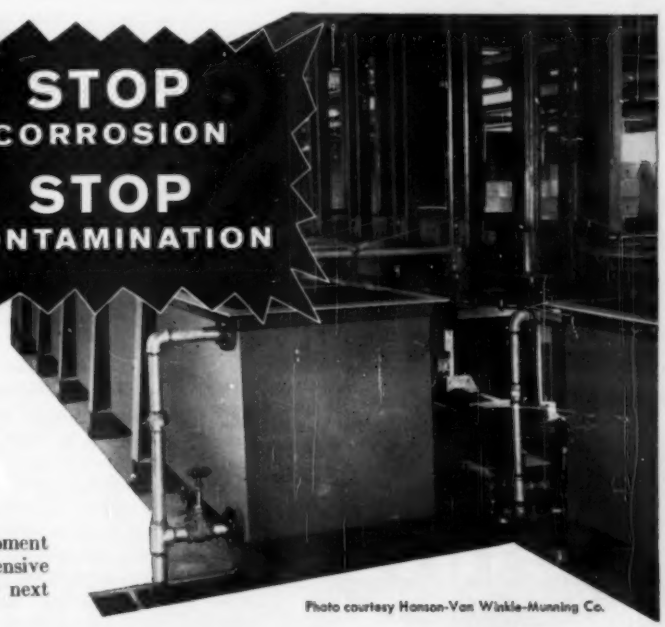

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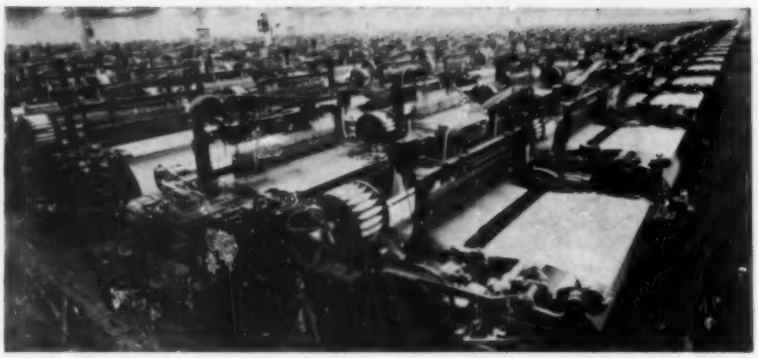

A veritable sea of buff fabric weaving machines viewed by Southeastern Branch during tour of Deering Milliken's Gainesville, Ga. mill.

tion built for them to buff with. George Taylor was heard to remark that it seemed a shame to apply "ole dirty buffing compound" to such high quality cloth but what George really meant was that he is grateful to the textile industry for its precision manufacturing of a cloth that enables him to get the optimum benefit out of his compound, labor, etc.

Following the last plant tour at 5:30 the Deering, Milliken personnel gave a formal summation and called upon the platers to work closer with them in their search for continued improved cloth for continued improved buffing.

We then met at 6:30 at the Main Ball Room of the Dixie Hunt Hotel, for a short cocktail party and then a buffet dinner, all sponsored by Deering, Milliken.

After a brief business meeting presided over by **Bruce Taylor** and then a question-answer session conducted by Mr. Garth, we adjourned and started home early; the more distant points included Greeneville, Tennessee; Greenville, S.C.; Adel, Georgia, and Griffin, Georgia. Twenty-six people from two different industries had new thoughts.

Robert H. Probert
Assistant Secretary

SPRINGFIELD

Murray Discusses Aluminum Plating

The Springfield Branch met at the Wayside Restaurant in West Springfield for the October 24 meeting. It was voted to continue with the monthly meetings for the balance of the season, at the Wayside.

After a short business meeting, which included the acceptance of the revised set of bylaws, the balance of the evening was turned over to the librarian, **Leo A. Diamond.** Leo introduced the speaker for the evening, **William K. Murray,** manager of marketing for Enthone, Inc. of New Haven, Conn. He is a Past President of New Haven Branch, and has served as a New England Regional Meeting Committee Chairman.

Bill had as his subject, "Plating on Aluminum." He said there were many reasons why aluminum is used as a base metal, such as light weight, corrosion resistance, low contact resistance, to name a few. And the reasons aluminum is plated is to increase the hardness, ease of solderability, plus others. Although the major part of the discussion stressed chromium plating of aluminum, other phases of finishes were brought into the picture.

After a quite complete explanation of the types of processes in use for various plates, Bill asked for questions. And he got 'em. One thing is for sure—either Bill's fame must have gone on before, or there must have been an exceptional interest in the subject, because there was a near record turnout for the meeting.

Henry L. Heissfeld
Secretary

SYRACUSE

Polishing Presented by Gallien; Gray Branch Honorary Member

Roger F. Gallien of Behr-Manning Co., Troy, New York, addressed the Branch at the October 17 meeting.

Two very interesting movies were shown about manual and automatic polishing of various metals and products by means of using abrasive belts. Mr. Gallien had an intensive listening and viewing audience who appreciated not only the excellent color movie with explanations by Roger Gallien, but also the very lively discussion which was conducted after presentation of the movie. Even people not directly interested or connected with polishing and coating of metals were benefited by this commendable talk in an excellent educational program.

It was unfortunate that **Dan Gray** of Oneida, Ltd. was absent due to illness so that the Branch President was unable to officially install Mr. Gray as an Honorary Member of our Branch, which had been decided upon by a unanimous vote at our membership meeting of September 19 at the Geneva Country Club, Geneva, New York.

R. Sonnenfeldt
Recording Secretary

BRANCH EDUCATION

TORONTO
Cudbird Discusses Protective Coatings

Two short films and a talk outlining some of the recent developments in the protective coating field were presented by J. Cudbird, of Canadian Hanson & Van Winkle, at our regular dinner meeting held October 14 in the Algonquin room at the Royal York Hotel.

Kergan Wells was elected the paid Delegate of the Branch and will attend the annual convention in Boston next year.

Two new members were welcomed into the Branch by President **Gord Lince**, who presided over the meeting.

Entertainment chairman **Brock Laws** reported arrangement completed for the Branch's fall dance, being held November 11 at Casa Loma.

Brock W. Laws

WATERBURY
Durney Tells of Costing Methods

The Waterbury Branch held its regular monthly meeting at the Roger Smith Elton Hotel on Thursday, October 13. President **Bill Giesker** called the meeting to order and reported on the first organizational meeting of the AES Branches which join together to sponsor the New England Regional Meeting. The Waterbury Branch has charge of advertising for this year's program.

The Branch approved three applications for membership.

Technical Chairman **Frank Tirendi** introduced the speaker of the evening, **Laurence Durney** of Enthone, Inc., who spoke on the subject of "Costs of Metal Finishing." Mr. Durney discussed the several methods of arriving at the cost of producing parts and the advantages and disadvantages of each. The paper was very well received and many questions followed.

Francis A. Schneiders
Publicity

AT ST. JOSEPH VALLEY

During the October 5 meeting of St. Joseph Valley, Dr. Harold J. Wiesner gave a brief outline of a proposed basic and advanced plating course, and spoke of those responsible for it. The course will begin in March to avoid inclement weather and holiday conflicts.

Henry A. Meers
Secretary

AT ST. LOUIS

Ed Sertl reported at the October 12 meeting of St. Louis Branch that the fall term of the Branch's Electroplating School had started. Despite a poor response to the mailed applications, 25 students registered the first night.

Ward Kelly
Secretary

WESTERN ONTARIO
Round Table Conference, Ladies' Night Date Set

The October meeting, was held in the Wm. Pitt Hotel, Chatham, President **Jim Kelly** presiding. Due to circumstances beyond the control of the Branch there was no speaker. Therefore, the evening was devoted to a round table conference on the betterment of the Branch. Discussion was carried on as to the planning of the Branch. The outcome of this was the decision for further advanced planning to try and make the meetings more educational.

The date of the Annual Ladies' Night Dinner and Dance was set for January 20, 1961, under the direction of Chairman **Bob Dobson.** This event will be held in the Wm. Pitt Hotel, Chatham.

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Boston: R. A. Carbone, J. A. Devency, M. M. Jacobson, M. Levy, E. N. Mills, E. B. Murphy, W. W. Potter
Central Michigan: T. C. Lutzke
Chicago: R. F. Ryan, J. C. Eckhardt, T. G. Hanson, V. T. Farr, J. McDonald, J. O. Miller, R. V. Sebelik, D. L. Blaydes, G. C. Jirsa Jr., J. A. Grimes, J. Pekarik, D. J. Socha, L. E. Simon
Cincinnati: R. J. Zawadzki, M. R. Hackman, G. Seymour, P. L. Vadeboncoeur
Columbus: W. J. Terreli, N. R. Buckles
Detroit: W. R. Bassett, C. A. Berube, S. T. Bilger, L. E. Hebert, J. L. Mitchell, E. Darin, A. F. Joseph, R. D. Bailey, F. R. Cannestra, W. A. Boycott Jr., F. W. Cole, R. J. Blandino, M. Krafthefer, R. J. Rhead, T. F. Sullivan Jr., W. H. Lofton, Mrs. H. Gassen
Hamilton: T. P. Kelly
Hartford: M. K. Nilsen, E. J. Brackett, E. F. Killian Jr.
Memphis-Midsouth: D. Jamison, J. Hagerling
Miami: A. F. Rotoli
Newark: A. W. Bugna
Pittsburgh: W. J. Morar
Providence-Attleboro: G. A. Smith, J. M. King
Rochester: S. A. D'Angelo, J. J. D'Amico
St. Louis: N. Wittman, J. L. Griffin, G. J. Berg
San Francisco: T. J. Joyce, I. Edwards
Sydney: K. J. C. Chapman
Toronto: D. C. Severs, K. Roundell, S. Watson
Waterbury: P. R. Russo, E. S. Duncan, E. F. Quarton
Wichita: R. W. Baldwin
Member-at-Large: I. de la Miyar, P. Sen

REINSTATEMENTS

Boston: E. D. Carr
Capital District: F. X. Leone
Detroit: M. R. D'Amico, L. J. Mahoney Jr., F. Maker, J. D. Patrick, Wm. H. Ross, D. J. Schindehette, R. D. Sparling, J. J. Stork, C. R. Wiese, H. Zielinski
Miami: S. D. Anderson, D. Schwartzberg, J. Linn, Wm. W. Hopkins, A. P. Ribbe, C. Piedrahita
Milwaukee: R. J. Miszewski, J. G. Miszewski Jr., G. T. Felzien, C. Strupp, B. A. Rohs, T. Kaltenbach
Mohawk Valley: W. Walczyk
Newark: R. Litterio
Philadelphia: W. H. Brown, E. A. Walter, C. E. Atkinson
St. Joseph Valley: G. Machan, D. R. Culp
Toronto: J. D. Buchan, T. Conroy, P. J. Lehman, W. B. Stratton

TRANSFERS

Blue Ridge: F. Ciandella from Hartford
Chicago: J. L. Ross from New York
Grand Rapids: M. Tippman, R. A. Nyquist from Saginaw Valley
Memphis-Midsouth: C. E. Nixon from Member-at-Large
New York: E. Malone to Newark, B. Brooks to Memphis-Midsouth
Phoenix: R. Mastellor from Los Angeles
Member-at-Large: C. E. Nixon to Memphis-Midsouth

RESIGNATIONS

British Columbia: S. R. Price
Buffalo: J. Mamon, A. E. Grazen, R. Piccoli, N. Hornug, R. Waszak, R. S. Stebbins
Cincinnati: W. A. Hopkins
Cleveland: C. McGarity
Detroit: L. F. Baumgarten, H. J. Bock, H. E. Crawford, C. D'Aquila, R. S. Firlik, H. W. Heilman, D. M. Searns, J. R. Dufty
Memphis-Midsouth: C. E. Page, R. Yahola, L. H. Griffith
New Haven: B. F. Dodge, R. T. Haubrich
New York: A. H. Johnson
Phoenix: L. Cline
Pittsburgh: F. J. Fitzpatrick, W. J. Musmanno
Rochester: B. Lindstrom, P. Pelligrino, J. Tindale
Toronto: D. A. McLean, H. B. Underhill

SUSPENSIONS

(Mainly Per Capita Tax Streamlining)

Boston: J. Gottlieb, P. J. Hunter, K. Ogasapian
Buffalo: S. Biondolillo, D. Black, J. Gerry, A. J. Gude, R. Lawicki, Wm. Lawicki, S. B. Nania, R. W. Talmon, L. Walczak
Chicago: K. W. Schwartz
Cincinnati: H. Murphy
Cleveland: J. Baker, C. Berger, E. Bolon, F. Carlson, S. Dobos, D. Durbin, W. Ehrenschneider, F. Ezzo Jr., T. Gill, A. Gruler, F. Hass, M. Hodnick, G. Kregelius, J. May, B. Larchman, C. Masek, J. Matas, E. Michel, K. Morelli, J. Muckley, W. Olah, K. Prentice, W. Rohde, R. Sasenn, H. Schram, A. Singleton, R. Smith, C. Speer, R. Stavely, J. Thayer, G. Walton, J. Weber, L. Wetring
Detroit: J. P. Allen, H. Allsteadt, M. Ambrozy, W. G. Anderson, D. C. Austin, A. R. Balden, J. T. Bell, J. L. Bretz, J. D. Brody, E. M. Bunjac, W. L. Byard, C. T. Campbell, F. J. Connor, F. Cook, M. R. D'Amico, F. C. Davis, E. H. Drew, E. C. Dumas, D. W. Dyer, J. E. Froehlich, V. J. Gach, G. G. Gendron, F. M. Giarmo, R. B. Goodrich, A. G. Hajjar, R. C. Hartmann, A. Hartung, P. F. Highberger, H. J. Jendrzynski, Dee Jones, U. C. Jones, K. E. Kasper, C. B. Kemen Jr., J. H. Kerrigan, H. R. Koskoski, W. L. Lawrence, H. G. Leeds, R. H. Louden, S. B. Lurie, V. C. McBride, R. J. McGough, L. J. Mahoney Jr., F. Maker, M. B. Martin, B. A. Matrille, L. A. Mead, R. K. Miller, E. L. Morrison, H. E. Morse Jr., J. M. Northrup, J. Novara, J. D. Patrick, F. D. Patterson, S. Pawlak, A. W. Reckling Jr., Wm. H. Ross, P. W. Sawyer, D. J. Schindehette, S. W. Self, P. W. Sheppard, T. R. Smith, R. D. Sparling, J. J. Stork, J. Toth, H. S. Trembath, J. F. Vetowich, A. J. Wallace Jr., P. A. Waskevich, C. R. Wiese, L. P. Wroblewski, F. Zagari, H. Zielinski
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(*Continued from page 1344*)

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Stanley P. Sax.
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b. *ABRASIVE BELT LENGTHS STANDARDIZED.*
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Bernard Gaida.
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George F. Bentinck and Alvin E. Hohman.
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I. Laird Newell.
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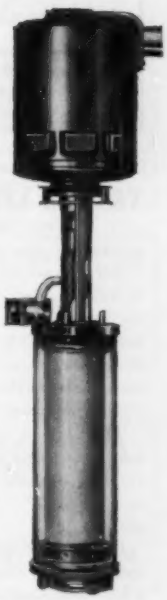

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TRADE LITERATURE

(*Continued from page 1400*)

equipment, mercil-type hanger equipment; hanger mounted motor drive equipment; cylinder materials and construction; plating barrel contacts; tank and drive equipment and tank transfer equipment. A final bulletin gives complete specifications for all standard model barrel units and all mercil-type model MH barrel units.

The H-VW-M Plexiglas cylinder is fully illustrated and described. This type cylinder has one-inch heads and half-inch panels and are ribless and molded in one piece.

Plexiglas is described as excellent material for all solutions (except chromium) where temperatures do not exceed 180F.

All bulletins are contained in a color folder, Bulletin No. PB-111 and are available on request.

L—1207. BRONZELESS GOLD SPRAY FINISH—New folder from Bee Chemical Company describes bronzeless gold spray finish, which is claimed to simulate the appearance of fine bronze powders. Folder gives product data on bronzeless gold systems for metals and thermoplastics, shows color chips of standard colors and typical applications by appliance and electronic manufacturers.

L—1208. VENTILATORS—Solid plastic roof ventilators for removing corrosive fumes are described in Data Sheet E-7801 by Heil Process Equipment Corporation. Upblast discharge blows the fumes high into the air, minimizing corrosion to nearby roofs and ground areas, and reducing chances of fumes re-entering the plant. Nothing to rust. Ten standard sizes.

L—1209. TEMPERATURE CONTROLS—Transistor circuits and thermistor sensing elements are among the features of four new Fenwal temperature controllers, described in Bulletin MC-190. A major feature of the new line is the wide choice of optional features—proportioning or on-off control action, several temperature ranges and scales, remote or local control, and others.

L—1210. CHEMICAL/METAL FINISHING NEWSLETTER—The Hubbard-Hall Chemical Company has begun publication of a chemical and metal finishing newsletter, designed to keep New England metal finishers aware of new products being developed at Hubbard-Hall and alert to technological changes in the metal finishing and chemical industries. The newsletter will be published bimonthly.

L—1211. COLOR COATINGS—A new chemical surface treating process, which for the first time color coats all types of metals in a single treatment, is now ready for commercial application, Pennsalt Chemicals Corporation has announced. Called the Hinac process, the new coating is produced in several grades, clear and colored, which are corrosion resistant, have good weathering properties and are color fast. The process is said to combine ease of application with good corrosion resistance at economical cost.

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L—1212. EQUIPMENT CATALOG—The availability of a new 146-page, fully illustrated catalog describing in detail J. Holland and Sons, Inc. complete line of electroplating, polishing and spray painting equipment and supplies has been announced.

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FUTURE MEETINGS

AMERICAN ELECTROPLATERS' SOCIETY

December 16, 1960—**Editorial Board,** National Headquarters, Newark, N. J.

December 16-17, 1960—**Newark Branch Annual Educational Session and Christmas Banquet,** Robert Treat Hotel, Newark, N. J.

January 20, 1961—**Western Ontario Branch,** Annual Ladies Night Dinner and Dance, William Pitt Hotel, Chatham.

January 21, 1961—**Grand Rapids Branch,** Annual Educational Session and Banquet, Symposium on Quality Control, Pantlind Hotel, Grand Rapids, Michigan.

January 27, 1961—**Research Committee,** Conrad Hilton Hotel, Chicago, Ill.

January 27, 1961—**Cleveland Branch, Annual Educational Session,** Technical Center, Cleveland Engineering Society, Cleveland, Ohio.

January 28, 1961—**Cleveland Branch, Annual Banquet and Dinner Dance,** Carter Hotel, Cleveland, Ohio.

January 28, 1961—**Chicago Branch Annual Meeting and Banquet,** Conrad Hilton Hotel, Chicago, Ill.

February 3-4, 1961—**Third Annual Dixie Regional Technical Session,** Hotel Roanoke, Roanoke, Virginia. Blue Ridge Host Branch.

February 4, 1961—**New York Branch Annual Educational Session and Banquet,** Hotel Statler-Hilton, New York, N. Y.

February 4, 1961—**Saginaw Valley Branch Annual Educational Session and Banquet,** Frankenmuth, Michigan.

February 4, 1961—**Seventh Annual Tri-State Regional Meeting,** Deshler-Hilton Hotel, Columbus, Ohio.

February 11, 1961—**Eighth Interim Meeting,** Supreme Society, Statler Hotel, Hartford, Connecticut. New England Regional Council, Host.

February 11, 1961—**"Old Timers Night," AES New England Regional Council,** Saengerbund Hall, Hartford, Conn.

February 18, 1961—**San Francisco Educational Sessions and Dinner-Dance,** Jack Tar Hotel, San Francisco, Calif.

March 3-4, 1961—**Philadelphia Branch Annual Technical Session and Banquet,** Benjamin Franklin Hotel, Philadelphia, Pa.

March 4, 1961—**Dayton Branch 15th Annual Educational Session and Dinner Dance,** Biltmore Hotel, Dayton, Ohio.

March 11, 1961—**Rockford Branch, Annual Meeting,** Rockford, Ill.

FUTURE MEETINGS

April 8,	1961—**Editorial Board Meeting,** Statler-Hilton Hotel, Detroit, Michigan.
April 14-15,	1961—**Executive Board Meeting,** National Headquarters, Newark, N. J.
April 15,	1961—**Baltimore-Washington Branch,** Annual Banquet and Dance. Presentation of the "Order of the Pot," Baltimore, Maryland.
April 22,	1961—**Twenty-Second Annual New England Regional Meeting,** Hotel Statler, Hartford, Conn.
April 24-25,	1961—**AES Research Conference,** Bell Telephone Laboratories, Murray Hill, N. J.
April 26,	1961—**Research Committee Meeting,** National Headquarters, Newark N. J.
April 29,	1961—**Milwaukee Branch Annual Educational Session and Banquet,** Schroeder Hotel, Milwaukee, Wis.
May 2,	1961—**Central Michigan Branch Annual Educational Session and Banquet,** Hotel Hayes, Jackson, Michigan.
May 5-6,	1961—**Rochester Branch Fiftieth Anniversary Celebration Concurrently with Empire State Regional Annual Meeting,** Hotel Manger, Rochester, N. Y.
June 18-23,	1961—**48th AES Annual Convention,** Hotel Statler, Boston, Mass.
January 13,	1962—**Ninth Interim Meeting, Supreme Society,** Hotel Marott, Indianapolis, Ind.
June 25-28,	1962—**49th AES Annual Convention,** Schroeder Hotel, Milwaukee, Wis. Sponsorship Midwest Regional Council.
June 24-27,	1963—**50th AES Annual Convention,** Ambassador Hotel, Atlantic City, N. J. Sponsorship Newark Branch.
June 15-18,	1964—**51st AES Annual Convention,** Sheraton-Jefferson Hotel, St. Louis, Missouri.
June 16-18,	1964—**Sixth Industrial Finishing Exposition,** St. Louis, Missouri.
June 28-July 1,	1965—**52nd AES Annual Convention,** Statler Hotel, New York, N. Y.
June	1966—**53rd AES Annual Convention,** Hotel Fontainebleau, Miami, Florida. Dixie Regional Council, Sponsor. Southeastern Branch, Host.

INTERSOCIETY

Nov. 27-Dec. 2,	1960—**American Society of Mechanical Engineers,** Winter Annual Meeting, Statler-Hilton Hotel, New York City.
January 24-27,	1961—**Society of Plastics Engineers,** 17th Annual Technical Conference, Shoreham Hotel, Washington, D. C.
Jan. 30-Feb. 3,	1961—**American Society for Testing Materials,** Committee Week, Netherland-Hilton Hotel, Cincinnati, Ohio.

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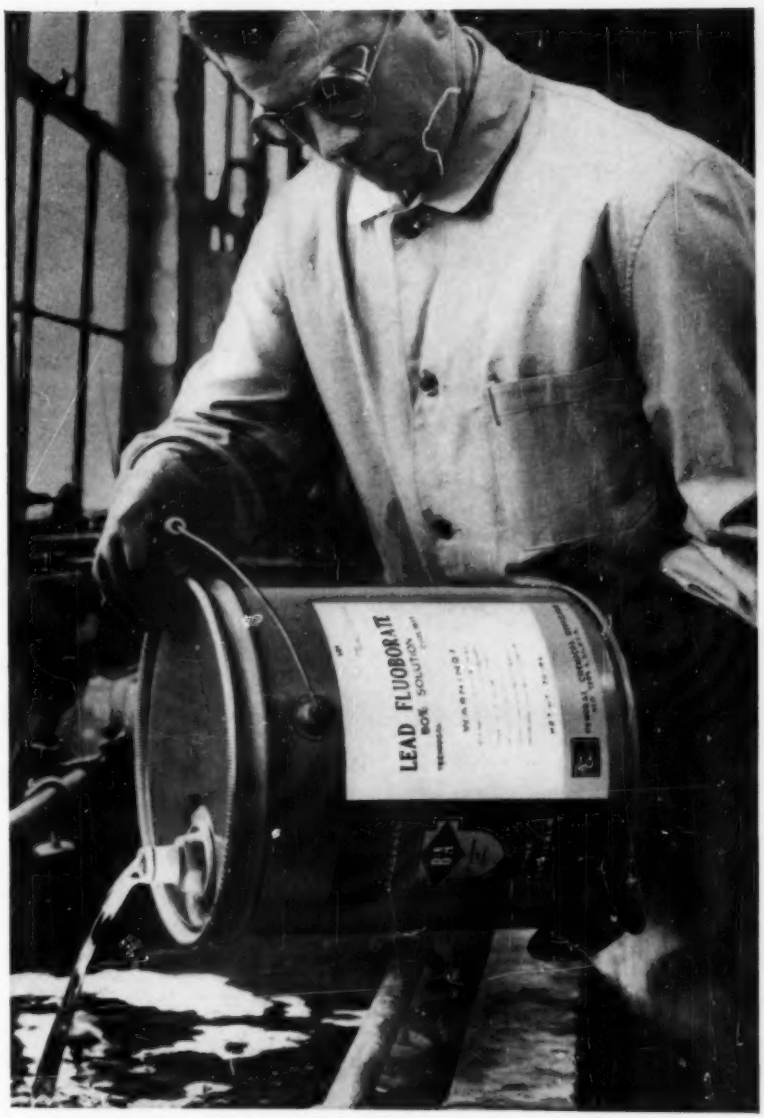

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